DOCTORAL THESIS

Developing consensus on the strategic priorities for the prevention of obesity amongst the Australian population

Haynes, Emily

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Developing consensus on the strategic priorities for the prevention of obesity amongst the Australian population.

Emily Haynes

BSc(hons1), PGDip Diet, RD

Principle supervisor: Dr Dianne Reidlinger
Associate supervisor: Professor Paul Glasziou

Faculty of Health Sciences & Medicine, Bond University, Gold Coast, Australia

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Abstract

Background: Previous research has identified key barriers to obesity-related policy implementation internationally and in Australia. Food industry stakeholders emphasise the lack of evidence and propose ethical concerns of a 'nanny state' around population-wide policies to regulate obesogenic environments, undermining public and political support for government intervention. Policy framing, and public and political support are essential for successful policy adoption, and collaborative research is essential to strengthen pathways to action. This thesis describes a body of research that is concerned with how governments can influence choice through obesity-related policy, with a specific focus on the concepts of policy intrusiveness and impact to autonomy.

Aim: The aim of the thesis is to explore the relevance of the two concepts, intrusiveness and autonomy, in driving the barriers to policy adoption, and propose a priority setting framework, informed by stakeholder consensus, that considers the ethical values of intrusiveness and autonomy to support mobilisation of obesity policy.

Methods: A review and meta-analysis aimed to assess the relevance of 'intrusiveness 'and 'autonomy' to school-based obesity prevention interventions and identify whether the levels account for the variance in the effectiveness of, and heterogeneity among, interventions reported in published trials. Secondly, a systematic review of choice architecture interventions was conducted and aimed to explore the effectiveness of positioning/placement interventions on beverage purchase and consumption. The third study comprised a document analysis of stakeholder's submissions to the federal Government Inquiry on Obesity. A content analysis of policy recommendations provided by stakeholders was conducted to explore the feasibility of classifying stakeholder submissions, according to their intrusiveness and impact on individual autonomy. Further, the study aimed to identify similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy. Finally, a policy-Delphi study was modified to bring forward the voice of under-represented stakeholders (namely consumers, public health practitioners and policy makers). The study design facilitated a collaboration amongst these stakeholder groups, in isolation from potentially vested interests (specifically academics and food industry). The study aimed to identify the extent to which perceptions of effectiveness, intrusiveness and autonomy

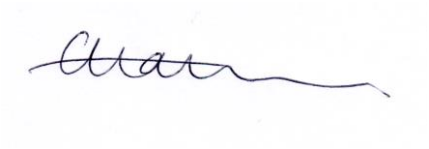
govern prioritisation of policy options by these stakeholders, and describe the feasibility of the method to explore consensus amongst this collaboration.

Results: The results of the first review indicate an association between the concepts of intrusiveness, autonomy and the effectiveness of interventions implemented in the school setting. The findings of the second review highlight a lack of primary research studies that investigate placement intervention effectiveness for beverage purchase and consumption, and recommends greater research activity given the likely acceptability of choice architecture interventions. The key findings of the document analysis of submissions to government indicate that stakeholders advocate intrusive and nonintrusive policy options which enhance individual autonomy, over those that reduce autonomy; however, this may differ according to setting, target behaviour and between five stakeholder groups. The findings highlight general similarities in recommendations across the groups, and gives rise to the possibility of consensus amongst stakeholders through the platform of autonomy. Finally, the result of the policy Delphi study illustrates a remarkably high level of consensus between three groups. An inconsistency between stakeholders' perception of policy intrusiveness and that predicted by ethical frameworks and vested interest lobbying is emphasised. A qualitative analysis indicates several potential contributors to individual perceptions of policy intrusiveness and impact on autonomy in the context of obesity-related policy.

Conclusions: The utility of collaborative research methods has been demonstrated by the research presented in this thesis. The findings emphasise the value of bringing forward under-represented views, to rebalance debate, and suggest that this may be the key to bolder obesity-related policies. There is scope to apply the methods in other national contexts and towards other complex public health issues where decision making is hampered by a lack of evidence. The priorities of dominant perspectives may deviate from other stakeholder groups, and where commercial and academic conflicts of interest are excluded from debate, there is high-level consensus around effectiveness and two ethical considerations to obesity policy adoption. Finally, reframing policy options through their impact on individual autonomy may strengthen societal support for bolder action. Despite currently limited empirical evidence for the effectiveness of population-wide policy to address obesity, governments should be confident in implementing those which are perceived to simultaneously enhance individual autonomy and the population's health. According to this research, this comprises the majority of obesity-related food policy options available to the Australian Government.

Declaration

This thesis is submitted to Bond University in fulfilment of the requirements of the degree of Doctor of Philosophy (PhD). This thesis represents my own original work towards this research degree and contains no material which has been previously submitted for a degree or diploma at this University or any other institution, except where due acknowledgement is made.



Name: Emily Haynes

Date: 4th May 2017

Ethics declaration

The research associated with this thesis received ethics approval from the Bond University Human Research Ethics Committee. Ethics application number: 0000015557

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The following papers have been derived from this thesis:

Haynes E, Palermo C, Reidlinger DP. Modified Policy-Delphi study for exploring obesity prevention priorities. *BMJ Open*. 2016;6:e011788. doi:10.1136/bmjopen-2016-011788

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Haynes E. Palmero C, Reidlinger D. Exploring stakeholder views on obesity-related food policy for Australia: A modified-Policy Delphi Study. *Public Health Nutrition*. Under review.

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Haynes, E. Glasziou, P. Reidlinger, D. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school-based interventions. Obes Facts 2016; 9(1):p 15. DOI:10.1159/000446744.

Haynes E. Hughes R. Reidlinger D. Enhancing or diminishing autonomy for obesity prevention: An analysis of the 'intrusiveness' of policy recommendations to the Australian government. Obes Facts 2016; 9(1):p 61. DOI:10.1159/000446744.

Haynes, E. Reidlinger, D. Hughes, R. Enhancing or diminishing autonomy for obesity prevention: An analysis of the ' intrusiveness' of policy recommendations to the Australian government. Obesity Reviews. 2016; 17 (2); 192. DOI: 10.1111/obr.12403

Haynes, E. Reidlinger, D. Diversity of stakeholder recommendations for responding to obesity in Australia: An investigation into the influence of options on autonomy. Obesity Reviews. Obesity Reviews. 2016; 17 (2); 192. DOI: 10.1111/obr.12403.

Haynes, E. Reidlinger, D. To enhance or diminish autonomy in responding to obesity: Similarities and differences across stakeholder recommendations. Obes Facts 2016; 9(1):p 150. DOI:10.1159/000446744.

Haynes, E. Reidlinger, D. Glasziou, P. Palermo, C. A modified ' Priority setting Partnership' for obesity prevention policy in Australia: Investigating the recommended levels of intrusiveness. *Obesity Reviews*. 2016. 17 (Suppl. 2); 196. DOI: 10.1111/obr.12403.

Haynes E. Palermo C. Reidlinger D. A modified 'Priority Setting Partnership' for obesity prevention policy in Australia: Investigating the recommended levels of intrusiveness. *Obesity Facts*. 2016;9(suppl 1) P146. DOI:10.1159/000446744

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
BMI	Body mass index
CHD	Coronary Heart Disease
COI	Conflict of interest
CVD	Cardiovascular Disease
GBD	Global burden of disease
GLOPAN	Global Panel on Agriculture and Food Systems for Nutrition
INFORMAS	International Network for Food and Obesity / non-communicable Diseases Research, Monitoring and Action Support
IQR	Inter-quartile range
JLA	James Lind Alliance
NCD	Non-communicable disease
NHMRC	National Health and Medical Research Council
NHS	National Health Service
OFSTED	Office for Standards in Education, Children's Services and Skills
PPI	Public and patient involvement
PROSPERO	International prospective register of systematic reviews
RCT	Randomised controlled trial
SPSS	Statistical Packages for the Social Sciences
SSB	Sugar sweetened beverage
WHO	World Health Organisation

Intrusive: To restrict the liberties of individuals (Nuffield Council, 2007).

Autonomy: The capacity to self-rule (Griffiths & West., 2015)

The Nuffield Ladder of Intervention: A framework developed by the Nuffiled Council of Bioethics in Public Health Ethics (2007); underpinned by the concept of 'intrusiveness'. For details of the framework see Section 1.3.1.

The Balanced Ladder of Intervention: Referred to as the 'Balanced Ladder'; underpinned by the concept of 'autonomy' developed by Griffiths & West (2015) . For details of the framework see Section 1.3.1.

Liberalism: A political theory which favours individual liberty and equality.

Paternalism: Interference of a state or an individual with another person, against their will, and justified by a claim that the person interfered with will be better off or protected from harm.

Patient and public involvement (PPI): Defined by the National Institute for Health Research (NIHR) as '…research being carried out 'with' or 'by' members of the public rather than 'to', 'about' or 'for' them'. (INVOLVE, 2017).

James Lind Alliance: The JLA is a non-profit making initiative which was established in 2004. It brings patients, carers and clinicians together to identify and prioritise the unanswered questions about the effects of treatments that they agree are most important. (Cowen & Oliver 2013).

Underrepresented stakeholder: *Individuals* who have limited access or direct pathways to inform obesity-related policy.

Contribution to thesis

School obesity prevention; the intrusiveness and effectiveness of interventions: Review and Meta-Analysis (Chapter 3)

Authors	Conception & design	Study selection	Data extraction	Meta-Analysis	Drafting of manuscript	Critical revision
Emily Haynes	85	70	80	90	100	-
Dianne Reidlinger	-	-	20	10	-	100
Roger Hughes	10	25	-	-	-	-
Paul Glasziou	5	5	-	-	-	-

The effect of 'moderate' intrusion; nudging in the retail environment: Systematic Review (Chapter 4)

Authors	Conception & design	Study selection	Data extraction	Drafting of manuscript	Critical revision
Emily Haynes	70	50	80	100	-
Dianne Reidlinger	20	20	-	-	100
Suetonia Palmer	10	30	20	-	-
Ruth Mitchell	-	10	-	-	-

Obesity prevention advocacy in Australia: an analysis of policy impact on autonomy (Chapter 5)

Authors	Conception & design	Data collection	Data analysis	Drafting of manuscript	Critical revision
Emily Haynes	90	80	70	100	-
Dianne Reidlinger	-	20	30	-	80
Roger Hughes	10	-	-	-	20

Impacting autonomy with obesity policy: A comparison of the recommendations made between stakeholder groups (Chapter 5)

Authors	Conception & design	Data collection	Data analysis	Drafting of manuscript	Critical revision
Emily Haynes	80	80	70	100	
Dianne Reidlinger	20	20	30	-	100

Stakeholder perceptions of obesity-related food policy options for Australia: A modified-Policy Delphi study (Chapter 6).

Authors	Conception & design	Data collection	Data analysis	Drafting of manuscript	Critical revision
Emily Haynes	60	80	70	100	-
Dianne Reidlinger	30	10	15	-	75
Claire Palermo	10	10	15	-	25

Perceptions of policy intrusiveness and impact on autonomy: A qualitative analysis of policy Delphi data. (Chapter 7)

Authors	Conception & design	Data collection	Data analysis	Drafting of manuscript	Critical revision
Emily Haynes	60	80	70	100	-
Dianne Reidlinger	30	10	20	-	75
Claire Palermo	10	10	10	-	25

PART I

CHAPTER 1: OBESITY, POLICY AND ETHICAL FRAMEWORKS IN PUBLIC HEALTH.

1.1 Obesity: a global crisis

'*The epidemic of obesity is now recognised as one of the most important public health problems facing the world today…we estimate that around 224 million school-age children are overweight, making this generation the first predicted to have a shorter lifespan than their parents' (World Obesity Federation, 2015).*

1.1.1 Prevalence

Globally, the prevalence of obesity continues to rise amongst adults and children in developed and developing countries (Ng et al., 2014). In 2014, 41 million children under the age of 5 were overweight or obese worldwide (WHO., 2016a), and a recent analysis of the global prevalence in adults highlights a vast number of countries where most adults are overweight and obese. As it stands, no country has been successful in reversing the obesity epidemic across all ages (Ng et al., 2014).

In Australia the prevalence of overweight and obesity continues to rise in line with these global trends (Finucane et al., 2011; Ng et al., 2014; Sassi et al.,2009; Popkin & Slining 2013; Wang et al., 2007). Nearly two-thirds of adults and a quarter of children in Australia are overweight or obese (AIHW, 2016), and obesity prevalence rose by 27.5% for adults and 47.1% for children between 1980 and 2013 (Ng et al,. 2014). The risk of obesity amongst Australians is significantly greater for those of low socioeconomic status, Aboriginal and Torres Strait Islander people and those living in rural and remote areas (Penm 2008; ABS 2008). Recent data indicates a slight plateau in Australian children, which is undoubtedly positive (Nichols 2011; ABS 2015), and meets the primary objectives of the national preventative health strategy (Australian Government, 2009a), however reversing the trend and reducing prevalence across all ages is fundamental in reducing the risk of associated chronic disease (Australian Government 2009a; Singh et al., 2008; Webber et al., 2014).

The evidence associating obesity with chronic disease and premature mortality is extensive. Obese individuals are subject to increased risk of all cause (Flegal et al., 2013; Katzmarzyk et al., 2012; Kramer et al., 2013) and cause specific mortality (Bjorge et al., 2008; Katzmarzyk et al., 2012), regardless of the presence of metabolic syndrome (Kramer et al., 2013). The disease burden associated with overweight and obesity has increased by 82% in the last twenty years (ANPHA, 2013). A large body of research associates overweight and obesity with increased risk of cardiovascular disease (CVD), type 2 diabetes, cancer, gall bladder disease, osteoarthritis, liver disease, sleep apnoea and respiratory problems, poor physical functioning, bodily pain and mental illness including depression and anxiety (Abed & Wittert 2013; Bhaskaran et al. 2014; Freedman et al. 1999; Guh et al. 2009; Kasen et al. 2007; Katzmarzyk et al. 2012; Kramer et al. 2013; Luppino et al. 2010; Preiss et al. 2013; Roberts et al. 2003). The risk of developing obesity-related chronic associated disease is heightened by a history of overweight in childhood (Bass & Eneli 2015; Gordon-Larsen et al. 2010); thus bears a significant health risk for at least one quarter of the future adult population in Australia.

Obesity-related chronic disease is not only a concern amongst adults (Pulgaron 2013). Obesity has been associated with impaired glucose tolerance (Sinha et al. 2002), and the early onset of type 2 diabetes amongst adolescents with cases increasing in alignment with the rise in obesity prevalence (Gonzalez et al. 2009). Furthermore, greater insulin resistance has been demonstrated amongst children who do not meet dietary and activity guidelines (Huang et al. 2011). Overweight enhances the risk of childhood asthma, hypertension and liver disease (Bacha & Gidding 2016; Baker et al. 2007; Biro FM 2010; Mohanan et al. 2014; Narang & Mathew 2012; Reilly et al. 2003; Pollock 2015), and has been strongly associated with bullying and stigmatisation (van Geel et al. 2014) resulting in low self-esteem, suicidal thoughts and social isolation (Beck 2016; Morrison et al. 2015).

Childhood obesity may significantly hinder the development of healthy social norms. The physical and emotional barriers of being overweight to engaging in physical activity, can lead to a preference for sedentary behaviour over active lifestyles. Where these social norms in early life can shape unhealthy preference behaviours (Hawkes et al. 2015), the adverse effects of childhood obesity significantly increase the risk of unhealthy behaviour in adulthood. The urgency of addressing these early determinants of individual health is highlighted by the

World Health Organisation, who have demonstrated commitment to effective intervention in childhood through the development of the WHO Commission on Ending Childhood Obesity (WHO, 2016a).

The health cost of obesity and nutrition-related chronic disease is extensive at an individual and population level. However, the financial burden of obesity and overweight poses a significant threat to national economies across the world. The total economic impact of obesity is predicted at around $2 trillion a year (Wang et al. 2011). The most recent estimations of the combined direct and indirect financial costs of obesity in Australia and the United States of America are $56.6 billion and $147 billion respectively (Colagiuri et al. 2010; Finkelstein et al. 2009), and the significant financial burden of rising obesity on the British economy has been identified as a significant threat to the future of the National Health Service (NHS) (Morgan & Dent, 2010). Furthermore, given the acute rise in prevalence in developing countries, the financial burden of obesity-related chronic disease and the nutrition transition within several developing nations is of great concern. Subsequently, addressing malnutrition, now in the context of overweight, as well as underweight, remains as a substantial global challenge (Hawkes et al. 2013; Popkin & Slining 2013).

1.1.2 Determinants

A large web of individual and environmental factors may contribute in varying degrees, to the rise in obesity prevalence. These factors are most explicitly illustrated by the Foresight map (Government Office for Science, 2007), which demonstrates how obesity has been shaped by the 'side effects' of complex systems. These systems have been developed over time to solve problems, but now respond as barriers to interventions with different objectives (Sterman, 2006). The Foresight map has been valuable in identifying key leverage points to shape proposed solutions to obesity and instrumental in highlighting important research priorities (Finegood et al. 2010). However, despite the value of the report as a key reference, the greatest challenge lies in effectively addressing these determinants which are inherent to the complex systems in which we live.

In order to address the vast portfolio of contributors to obesity, immense policy reform at a systems level, on a global scale would be required. Isolating the leading determinants and addressing them at a population level provides a more manageable challenge, and several

systematic reviews have summarised the primary determinants, as identified by best available data. Over the past 30 years, an increase in energy density and composition of diets, a rise in physical inactivity levels and potential biological changes have been presented as primary contributors to the development of obesity (Blair et al. 2013; Bleich et al. 2008; Church et al, 2011; Popkin 2001; Prentice & Jebb 2004; Swinburn et al. 2009).

The significance of the effect of biological changes on global prevalence in the last 30 years is questionable (Swinburn, 2008, Swinburn et al, 2011). These decades have seen a global shift in the abundance of energy dense, nutrient poor foods (Popkin 2001, Popkin 2006) and energy-saving technologies, which have increased energy intake and reduced expenditure (Swinburn et al., 2011). In response, there has been a focus on how the environment shapes behaviours which influence energy balance, particularly the built environment and the way individuals respond to it (Swinburn et al. 2011). Subsequently, a large volume of high-quality research (Briggs et al. 2013; Cabinet Office, 2010; de Silva-Sanigorski et al. 2010; Food Foundation, 2016; Hall et al. 2011; Hillier et al. 2011; IPHI, 2012; Jebb 2007; Millstone & Lobstein, 2007; Simon et al. 2008; VicHealth, 2016; Waters et al. 2011) and ensuing strategies (Australian Government, 2009b; Action on Sugar, 2014; OFSTED, 2013; NSW Government, 2013; NZMA, 2014; WHO, 2013; WHO, 2016a) focus on two major drivers and their interactions with the wider environmental cues; dietary behaviour and physical activity behaviours.

Diet

Diet is the leading contributor to non-communicable disease risk in the world (GBD, 2015). There has been an evident rise in the availability and access to energy dense, nutrient poor food and drink in developed and developing countries. The shift has been recognised as a leading contributor to non-communicable disease, and the obesity epidemic is, in part, attributed to this global 'nutrition transition' (Popkin 2001). Consequently, effective food policies have an essential role to play in reducing the obesity epidemic (Hawkes et al, 2015).

Energy-dense diets have been widely associated with weight gain, overweight and obesity (Bleich et al, 2008). The significance of diet composition on weight gain and obesity has been a subject of debate (Astrup & Brand-Miller, 2012; Bradley 2012; Bray & Popkin 1998; Forouhi et al. 2009; Hu 2013; Kaiser et al. 2013; Swinburn & Hall, 2012; Vermunt et al.

2003), however there is strong evidence to support that reduction in consumption of total fat (Hooper Lee et al., 2012) or sugar (de Ruyter et al. 2012; Ebbeling et al. 2006) leads to weight loss toward healthy weight status. Dietary sugar and sugar-sweetened beverages are determinants of body weight in children and adults (Mozaffarian et al., 2011; Vartanian et al., 2007; Te Morenga et al., 2013), and the abundance of high sugar diets has been associated with rising obesity prevalence (Popkin 2006). Consumption of sugar-sweetened beverages is positively associated with obesity amongst children and adults (Ludwig et al, 2001; Malik, et al. 2006, Malik et al., 2013; Vartanian et al., 2007), and the introduction of SSB in early childhood increases the likelihood of obesity in later life (Cantoral et al., 2016) which overrides the beneficial health-related effects of breastfeeding (Silveira et al., 2015). Conversely, weight gain has been inversely associated with dietary intake of fruit, vegetables and wholegrains (Mozaffarian et al. 2011). There is an association between fast food consumption and increased caloric intake, which is suggested to increase risk of obesity (Rosenheck, 2008), and socioeconomic status, learned preferences and access or availability of unhealthy foods have been suggested amongst many potential determinants to consumption (Mazarello Paes et al., 2015).

At a national level, evaluations of the Australian Health Survey indicate the inadequacy of the typical Australian diet. The likely contribution of such to obesity prevalence is supported by evidence that a large proportion of the Australian population fail to meet the dietary guidelines which are designed to promote a healthy weight (ABS, 2016). Compared to global guidelines, over 50% of Australians exceed the World Health Organisations daily recommended intake for added sugars, and of concern for children and adolescents the occurrence is significantly greater (76% of 9-13 year olds) (Lei et al. 2016). At a national level, less than 10% achieve the Australian Government target of daily vegetable intake, and over 40% of the diets of Australian children are made up of discretionary foods (Rangan et al. 2007). Social inequalities contribute further to the inadequacy of the Australian diet and those in remote or rural areas, of low socioeconomic status or Aboriginal or Torres Strait Islander peoples are at greater risk of poor nutrition, which has in part been attributed to limited access to healthy food (Lee et al. 2009).

Individuals have a degree of responsibility for maintaining a healthy diet in the interest of their personal health, however it is widely acknowledged that food systems, and consequently food environments, are integral in determining dietary quality (GLOPAN, 2016). The

globalisation of food systems that promote unhealthy diets has been identified as a fundamental contributor to the obesity epidemic (Swinburn et al. 2011). Consequently, a large proportion of public health advocacy to reduce obesity prevalence is directed toward dietary factors. Strong evidence is available to support diet-related strategies for obesity prevention, in isolation and as part of comprehensive prevention programs (Waters et al., 2011). Subsequently, policies which aim to alter dietary intake at individual, settings, environmental or systems level are of high priority on the obesity policy agenda.

Physical Activity

Sedentary behaviour is a primary contributor to weight gain, and is positively associated with weight gain (Mozaffarian et al. 2011), obesity (Mitchell et al. 2013), and risk of death (Lee et al. 2012). There is strong evidence to suggest that increased level and frequency of physical activity reduces the risk of obesity (Brown et al. 2007), and that moderate intensity physical activity of about 60 to 75 minutes per day, may reduce the increased risk of death associated with sedentary behaviours (Ekelund et al., 2016). Furthermore, the inverse association between cardiorespiratory fitness and risk of being overweight (Bovet et al. 2007) strengthens the link between physical inactivity and the risk of becoming obese or overweight.

Physical inactivity is responsible for a substantial economic burden, particularly in high income countries (Ding Ding et al., 2016). The direct health care costs and indirect expenses associated with morbidity and loss of productivity are estimated to be $53.8 billion worldwide, and incur a cost of over $550 million to the Australian economy (Ding Ding et al., 2016). Similar to diet, physical inactivity provides a substantial economic and health burden independently, as well as increasing the burden of obesity-related chronic disease. Therefore, strategies designed to reduce obesity, by addressing the pandemic of physical inactivity, are likely to generate significant health and economic improvements regardless of weight status (Ding Ding et al., 2016; Lee et al. 2012).

Despite slight improvements in the last ten years, physical activity levels in Australia are generally poor compared to national guidelines. Recent data suggests that two-thirds of Australians are classified as sedentary or undertaking low levels of physical activity (ABS 2015b). In response, several national, state and local strategies have been developed to encourage physical activity. Multiple sectors, across the three tiers of government, influence

the built environment, and the strategies are the collaborative effort across several National and State Departments, including Departments of Health, Sustainability, Environment and Conservation, and National Parks, Sport and Racing. Additionally, several non-government organisations are directly involved such as the Australian Local Government Association and the Planning Institute of Australia, and a collaborative approach to implementation is therefore required.

Several correlates and determinants to physical activity have been identified. These include individual and interpersonal factors such as age, gender, health status, self-efficacy, motivation and social support (Bauman et al. 2012; Brown et al. 2007; Wendel-Vos et al. 2007). Further environmental factors including access to and availability of exercise facilitates and sport equipment (Bauman et al. 2012, Wendel-Vos et al. 2007) and built environments including connectivity and public transport for active travel (Giles-Corti et al. 2016, Sallis et al. 2016) are significant in determining physical activity behaviours. Regarding the built environment, a lack of progress has been attributed to the need for a collaborative approach toward urban planning policies, to effectively modify the built environment to facilitate physical activity (Giles-Corti et al. 2016).

Given that physical inactivity and sedentary behaviour are primary contributors to weight gain and obesity prevalence, there is a wealth of research which explores exercise as a treatment. A large systematic review and meta-analysis is currently being updated and led by the author of this thesis, for the Cochrane Endocrine and Metabolic Disorders Group, which will summarise the effect of exercise on a series of obesity-related outcomes (*Exercise for Overweight & Obesity*). The review is ongoing but the findings to date, support the findings of existing research (Pontzer et al.2016) and suggest that a combination of physical activity and dietary interventions may be most effective to reverse obesity amongst overweight and obese populations (*Unpublished, Haynes et al*).

1.1.3 Summary

Obesity is prevalent and costly at an individual and population level. The rise in prevalence has been attributed to a complex interaction of genetic, behavioural and environment-related factors. Population-wide change in dietary and activity-related behaviours is required to reverse the trend in obesity.

1.2 Australia's position on obesity-related policy

'Obesity prevention interventions should be supported by policies at all levels of government – national, regional and local. National policies can create supportive environments; regional policies can facilitate pooling of resources; and local tailoring of interventions results in more effective targeted interventions. Global (intergovernmental) support for obesity prevention can help to address transnational environmental factors, such as creating a healthier food supply' (World Health Organisation, 2012).

1.2.1 Current strategies

It is widely acknowledged that the trend in obesity will not be reversed without government action and regulatory policy (Chan 2013; Crammond et al. 2013; Swinburn et al. 2011; WHO 2013; WHO 2016a). The growing burden of obesity at individual and population level urgently requires government to take account of the issue and take bold policy action (Ng et al. 2014, AIHW 2016). The World Health Organisation has called for cohesive strategies, led by national governments, to modify the environment to promote healthy choices (Chan 2013, WHO 2013, WHO 2016a, WHO 2016b, WHO 2016c). It has been suggested that an effective approach employs all levels of government, and numerous government sectors which influence obesity-related behaviour, particularly those which influence the food and physical activity environment (Sacks et al. 2008). In response, policy frameworks have been proposed, in national and international context, to guide governments to implement a cohesive and comprehensive portfolio of actions to address the problem (Hawkes et al. 2013; Lang & Rayner 2007; Sacks et al. 2008;Swinburn et al. 2005).

The World Health Organisation has provided central leadership to address obesity a core component of strategic efforts to tackle non-communicable disease (WHO 2013). Their Global Action Plan for the prevention and control of NCD's 2013-2020 outlines nine primary action areas to strengthen national efforts to reduce chronic disease risk factors including

unhealthy diet, physical inactivity, and tobacco and alcohol use. The plan describes six core objectives and nine voluntary global targets to address the rise in NCDs world-wide. The seventh target directly relates to obesity, and challenges governments to 'halt the rise in obesity and diabetes' by 2020. A menu of policy options complements the strategy to assist national governments to implement effective policies to meet the global targets.

In response to the leadership from the World Health Organisation, strategic action has been taken by governments around the world to reduce the risk of obesity and associated chronic disease. Most countries or continents have a strategy on obesity, healthy eating or physical activity (Roberto et al. 2015). The European Food and Nutrition Action Plan 2015-20 provides an exemplar strategy which outlines clear objectives for European governments which align with WHO's vision (Europe 2014). Furthermore, the Physical Activity Strategy for the WHO European Region (2016-2025) outlines cohesive actions prepared in light of WHOs voluntary activity targets (Europe 2015). In the UK, a comprehensive childhood obesity strategy has recently been launched, which includes reformulation targets for industry, regulations to retail environments and a SSB tax which are underway (Department of Health, 2016). In Brazil, efforts have been highly commended (International Obesity TaskForce, 2010) given the integrated interdepartmental and intersectoral approach to obesity policy strategy development and implementation (Jaime et al, 2013).

These comprehensive strategies have prompted national governments around the world to implement potentially effective policies, regardless of a lack of evidence, in light of the urgency of the problem. Interestingly, some of the boldest examples of obesity-related food policy have been actioned by governments in developing countries such as Brazil and Mexico, and suggest that the sharp rise in prevalence experienced by these underserved populations may be countered with a sharp decline in obesity prevalence. Despite these examples, a large proportion of policies implemented to date have remained low-level, voluntary or settings based. However, the use of legislation by government, to protect against obesity-related behaviour is improving.

Internationally, legislative tools are increasingly employed as a component of government action to improve food environments. Chile implements legislation to ensure standardised nutritional labels and warning statements, and the USA and several Australian states legislate for KJ labelling on food outlet menus. Advertising bans have been implemented to reduce

advertising and marketing of unhealthy foods to children (Qubec, Norway, Sweden, Ireland, Chile, South Korea, Spain, Poland, Uruguay). A number of regulations have been applied to schools. Brazil's National School Feeding Programme and school food procurement law provides an exemplar stealth intervention which aims to benefit population health and the local economy, and the Japanese Basic Law on Shokuiku supports school food provision and nutrition curriculum by providing school dietitians. Government subsidies or levies have encouraged price differentials between healthy and unhealthy products in Australia and Poland, and recently changes to import tax has reduced the relative cost of fruit and vegetables in Tonga and Fiji. Hungary's public health tax increases the price of foods high in sugar or salt, and Mexico's leading example of a tax on sugar sweetened beverages has since been implemented or agreed in several countries (including France and the UK). In Wales, vending machines selling unhealthy foods are prohibited in NHS hospitals. Zoning laws have been implemented in Ireland and the UK, and NYC's Green Cart Permit ensures that healthy food vendors accessible in underserved areas of the city. Finally, the Responsibility deal in the UK, provides key example of industry-to- government collaboration and aims to improve access to healthy food at retail and manufacturer level. Despite its voluntary approach the deal has recently initiated industry-led reformulation of unhealthy food products (including pledges from Nestle and Tesco).

Governments have acted to improve the physical activity environment by facilitating active transport, improving access to sports facilities, and implementing programmes which discourage sedentary behaviours, however there is still failure to implement physical activity strategies at population level (Das & Horton 2016, Reis et al. 2016). Finland is one of few countries to experience a rise in physical activity over the last 30 years (Hallal et al. 2012), which may be largely attributed to exemplar access to sport and exercise facilities. A portfolio of policies have been implemented in Brazil to improve the quality of, and access to local areas to engage in physical activity (Jaime et al. 2013). Japan's national transport system invests in mass transit which encourages incidental activity through active transport and components of national cycling strategies have been implemented with the support of Sustrans (NGO) in the UK. At a programme level, global initiatives such as Park Run have been successful in increasing participation in physical activity (Stevinson 2014), and school-based programmes have been implemented in response to statutory standards for physical activity through the national curriculum (Ofsted 2013). However, there is an urgent need for

political commitment and funding to effectively implement national strategies (Das & Horton 2016; Reis et al. 2016).

In Australia, action on obesity has been disappointing, however the Australian Government has a track record of success in reducing high-risk health behaviours through national legislation. This is despite the difficulties associated with legislating in the interest of public health, often in direct conflict with other, largely commercial interests (Brownell & Warner 2009). Australia has lead the way in addressing other complex public health issues through effective interventions to reduce tobacco, alcohol and road-traffic related behaviours (ANPHA, 2013), and was the first country to implement a national healthy weight strategy (ANPHA, 2013); however, progress around obesity prevention since then has been slow. To date Australia has no extant national obesity strategy, and the majority of objectives of the most recent preventative health strategy, which relate to healthy weight, diet and physical activity, remain largely unimplemented.

Key barriers to government leadership for obesity-related policy have been identified across the three-tier structure of government, which may explain why leadership on obesity-related policy from national, state and local governments is limited (Allender et al. 2009; Allender et al. 2012; Crammond et al. 2013; Shill et al., 2012a, Shill et al. 2012b). Implementation in Australia has been largely limited to a low-level, self-regulatory approach that emphasises personal responsibility (Reeve 2016; Swinburn & Wood 2013), and legislative policy instruments are scarcely employed by the government (Crammond et al. 2013). Food policy actions to date are voluntary or self-regulatory, and legislative tools to promote physical activity have only been applied in Australian schools. The approach is inherently ineffective and aligns with the advocacy position of commercial interests, which lobby for deregulation, unrestricted marketing practices and against government protections for consumers (Brownell & Warner 2009; Chan 2013; Hebden 2011).

At state and local government level, policy development and implementation has shown more promise, and the introduction of KJ labelling in quick service restaurants, and other recent advancements in Victoria and Queensland are examples of this. New South Wales is one of few states in the world to show modest improvement in childhood overweight and obesity rates in younger age groups, and stabilisation of rates for children 5-16 years. To date, there remains inconsistency between states and an absence of a coordinated national policy

response to obesity. Consequently, the INFORMAS project has employed the Food-EPI tool to benchmark government action, across states, and advocate for a more cohesive approach to food policy (Sacks et al., 2017).

Despite the reserved approach until now, advancements have been made in Australia. A brief overview of some key examples which have been made in the Australian context is provided in Table 1.1

Table 1.1: Some examples of action on obesity taken by Australian governments at national and state level.

Action area	Action/Comment
Funding/ Strategy	National: Australian Federal Government has **no statutory health promotion agency** (ANPHA abolished by current government). **The Australian Prevention Partnership Centre** (NHMRC, DoH, NSW Ministry of Health, ACT Health, HCF (plus Research Foundation) – research center to address chronic disease. **National Prevention Health Strategy: The Healthiest Country by 2020:** Blueprint for tackling burden of chronic disease attributed to obesity, smoking and alcohol in Australia. **2016-2017 budget:** Only initiative relating to obesity-related food policy action was a $5.3 million over 3 years to continue implementation of Health Star Rating System. NHMRC Corporate Plan: 9 National Health Priority Areas - Obesity is one of
	State: NSW: New South Wales Health Eating and Active Living Strategy: Preventing overweight and obesity in NSW 2013-2018. ACT: Towards Zero Growth: Healthy Weight Action Plan WA: Western Australia Health Promotion Strategic Framework 2012-2016 VIC: Healthy Together Victoria SA: Eat Well Be Active 2011-2016 QLD: Health and Wellbeing Strategy (Queensland Health) NT: Northern Territory Health (NT Health) Nutrition and Physical Activity Strategy 2015−2020 TAS: Healthy Tasmania: Five year strategic plan (Dept of Health and Human Services).
Political leadership	National: **Australian Dietary Guidelines (Eat for Health):** National dietary guidelines and online resources. **Nutrient Reference Values Australia and New Zealand** (2006): National dietary intake recommendations. No reduction targets to meet guidelines. There is currently **no National Nutrition Policy:** scoping study (Lee et al.,2013) (which was released following Freedom of Information request) and in development phase. '**Closing the gap**; National Indigenous Reform Agreement (2008) **National Aboriginal and Torres Strait Islander Health Plan 2013-23** **Indigenous Australians' Health Programme**
Monitoring	National: Food environment monitoring***:* 2015-18 Coordinated Food Survey Plan**: ISFR monitors nutrition and health claims. **NUTTAB (2010) (**FSANZ reference database**):** Monitors nutrient composition of foods (to be updated late 2016); **AUSNUT 2011–13** database for estimating intake in accordance with Australian Health Survey. **FoodTrack™:** Monitors/collect supermarket nutrition data, and used to monitor the HSR system. **No** national monitoring of marketing unhealthy food to children, food quality in public sector or schools. Nutritional status monitoring: **The National Health Survey** (every 3 years by ABS- minimal nutrition/diet related data collected, BMI data collected in 2014-2015, self-reported NCD risk factors/health status). **The Australian Health Survey (**was conducted by ABS in 2011-13, included BMI ad biomedical data). Mortality: National Mortality Database, National Hospital Morbidity Database, Australian Cancer Database. **National Aboriginal and Torres Strait**

	Islander Health Survey (NATSIHS) – 2004-2005**; Aboriginal and Torres Strait Islander Health Performance Framework** 68 performance measures for Aboriginal and Torres Strait Islander health outcomes (includes nutrition/weight related outcomes). Program evaluation: **Evaluation Centre of Excellence** (ECoE) (DoH) to support/standardise programme evaluation. But no formal evaluation requirements.
Governance	National: Legislation/non-legislative instruments regarding declaration of vested interests in policy decisions: **Public Governance, Performance and Accountability Act 2013; Australian Public Service Values and Code of Conduct; Lobbying Code of Conduct; Commonwealth Electoral Act 1918 (the Act)** (includes declaration of political donations); and policies within organisations to reduce commercial interest (i.e. NHMRC, FSANZ). **No** standardised policy to apply to the use of evidence in food polices. **Stakeholder Engagement Strategy 2013-16:** Developed to address the FSANZ Act (1991) which requires stakeholder engagement in standard development process.
Food composition	National**:** **Australia New Zealand Food Standards Code**. No voluntary targets for reformulation or mandatory targets for out-of home meals.
Food labelling	National**:** **Australia New Zealand Food Standards Code**; all labelling in line with Codex Alimentarius standards. Ingredients and nutrition information panel required on all packaged food (with some exceptions). **Australian Consumer Law and Food Standard 1.2.7;** legislation to inhibit unjustifiable health/nutrition claims. **Voluntary HSR scheme** for packaged foods introduced in 2014. State: NSW, ACT, SA, QLD, VIC: **Legislation for KJ labelling on menu boards** in food outlets (>20 outlets in state/50 nationally).
Food promotion	National**:** **The Competition and Consumer Act** (2010): Legislation against misleading or deceptive. **Broadcasting Services Act** (1992) and the **Children's Television Standards** (2009): Legislation to protect children from harmful program material, and a number of standard restrictions to TV advertising to children including 'An advertisement for a food product may not contain any misleading or incorrect information about the nutritional value of that product'. Other regulations are **voluntary or self-regulated** by the Advertising Standards Bureau (i.e. Commercial Television Industry Code of Practice (2015); Subscription Broadcast Television Code of Practice (2013) AANA Code for Advertising & Marketing Communications to Children (2008); AANA Food and Beverages Advertising and Marketing Communications Code (2012); AANA Code of Ethics (2012); Australian Food and Grocery Council (AFGC) Responsible Children's Marketing Initiative (RCMI); Quick-Service Restaurant Industry (QSRI) Initiative for Responsible Advertising and Marketing to Children).
Food prices	National**:** **GST free basic foods** (including fruit and veg). **Australia's Free Trade Agreements**: low import duties on fruit and veg. **Statutory agricultural levies** **No** specific tax on unhealthy foods. **No** national food-related income support programs except **Income Management** (BasicsCard Scheme does not include fast-food takeaways or alcohol and promotes healthy food choices).

Food provision	National: **Education and Care Services National Regulations** (s78(1), s79(1)) Providers of 'education and care service must ensure that children being educated and cared for by the service are offered food and beverages appropriate to the needs of each child on a regular basis throughout the day' (s78(1)), and providers of 'education and care service that provides food or a beverage to children being educated and cared for by the service must ensure that the food or beverage provided is nutritious and adequate in quantity; and the food or beverage provided is chosen having regard to the dietary requirements of individual children…' **National resources**: Online '*Get Up and Grow - Healthy Eating and Physical Activity for Early Childhood'* for early childhood settings/families. '*Healthy Workers'* initiative web portal provides support and resources for private companies including healthy eating resources (funding ceased 2014). **National Health School Canteen Guidelines**: voluntary and implementation under discretion of state government. Online resources to support implementation. **National Quality Standard 2.2**: 'Healthy eating and physical activity are embedded in the program for children'. **National Safety and Quality Health Service (NSQHS) Standards**: None relating specifically to food. **Quality of Care Principles 2014:** Legislative principles to ensure meals are of adequate variety, quality and quantity for all service users (primarily malnutrition/dehydration related).
	State**:** **All states have mandatory standards in schools to align with NHSCG**: Includes classification of foods and 'red category foods' which sales are banned or restricted. NSW: **Nutrition in Schools Policy**- All schools should promote healthy eating and good nutrition. School canteens are required to implement the **NSW Healthy School Canteen Strategy** that includes food and drink criteria. QLD: **Smart Choices** - Healthy Food and Drink Supply Strategy for Queensland Schools VIC: **Healthy Canteens** – Online resources/kit WA: **Healthy Food & Drink** SA: **Right Bite-** manual and resource for canteens ACT: **Fresh Tastes** (program targeting whole school environment) **Canteen Fresh ACT** (ACT Health and Nutrition Australia ACT) TAS: **School Canteen Handbook**: A Whole School Approach to Healthy Eating. 2014. Tasmanian School Canteen Association Inc. **The Healthy Eating Advisory Service:** Support and training delivered by Nutrition Australia Victorian Division in public sector settings to meet state food guidelines (Victoria). **Healthy choices: healthy eating policy and catering guide for workplaces:** Support and training for private sector in Victoria (through Healthy Eating Advisory Service) – some freely available resources.
Food retail	National: Zoning laws are primarily the responsibility of local government in Australia, however guidance has been provided by multiple state governments ie QLD DoH Active Healthy Communities). **Outback Stores Pty Ltd**: Implements a nutrition policy in all stores to improve health and nutrition outcomes (stores in NT, WA. SA, QLD)
	State: **Stronger Futures in the Northern Territory Act 2012**: Community store licensing scheme to improve food security in NT, provides minimum standards and pricing policies.

Food trade	National**:** **National Interest Analysis**: Does not include compulsory Health Impact Assessment **Consultations** are also held with stakeholders to inform negotiation/decision making regarding proposed treaties.
Current physical activity guidelines/ strategy (in addition to general health/wellbeing)	National: A series of **National Physical Activity and Sedentary Behaviour Guidelines**: DoH: Australias Physical Activity and Sedentary Behaviour Guidelines for Children (5-12) ; Young people (13-17); Adults (18-64) and recommendations for children 0-5 years. Choose Health: Be Active (for older Australians). Make your move – sit less – be active for life! (for families): All include online resources. **Healthy Spaces and Places (2009):** National guide to designing places for healthy living – includes guidance on core design principles. Collaboration between Australian Local Government Association, Planning Institute of Australia and Heart Foundation- funded by Department of Health and Aging). Concluded.
	State**:** Western Australia: **Be Active-** State PA strategy. **Western Australia Bicycle Network Plan**: 2012- 2021- continuing development of metropolitan and regional cycling facilities. Victoria: **Physical activity, sport and walking: VicHealth's Investment Plan 2014-18**. Includes VicHealth Regional Sport Program and a series of other state level initiatives (Ride2School, Walk to School, Everyone Wins, Active for life, Healthy Sporting Environments). VicHealth also funding a range of projects including 'Changing the Game (to increase female participation in sport), and providing grants to support social and modified sport. Queensland: **National Parks, Sports and Racing Strategic Plan: 2016-2020** - Department of National Parks, Sport and Racing – supports and encourages active participation in physical activity. **Queensland Cycle Strategy 2011-2021.** **Active Healthy Communities:** Queensland South Australia: **Healthy Parks, Healthy People South Australia 2016- 2021.** Department of Health and Department of Sustainability , Environment and Conservation – Aims to encourage physical activity in nature.
Examples of advocacy	National: **Healthy Active by Design**: The Heart Foundation – online resources and advocacy. **National Cycling Strategy 2011-2016**- Australian Bicycle Council: Aims to double the number of people cycling in Australia in 5 years. **Moving Australia 2030:** A transport plan for a productive and active Australia (Moving People 2030 Taskforce) – aims to improve health by improving active transport- public transport, walking and cycling. **Blueprint for an active Australia**: The Heart Foundation - *Government and community actions to increase population levels of physical activity and reduce sedentary behaviour in Australia, 2014–2017*
Legislative policies	State**:** **All states Department of Education:** Schools are required to provide at least two hours of physical activity in the curriculum each school week for students in the primary and secondary years of schooling.

Sources: Food EPI report (Sacks et al., 2016), World obesity federation 2015, federal/state government websites.

1.2.2 Future approach

The sheer complexity of obesity's determinants complicates the identification of policy priorities (Lang & Rayner 2007). Global leaders in obesity prevention recently collaborated to highlight the slow rate of progress to date, and provide insight into the priority areas where action is most urgently required to reduce obesity (Roberto et al. 2015). A series of reports recommend framing the issue in the wider context of a 'systems approach' to improve public health. Additionally, the reports emphasised the defined need for governments and the private sector to take account for obesity prevalence. An accountability framework was developed to illustrate potential mechanisms to encourage accountability; whereby governments and civil society hold the private sector to account, and citizens hold the government to account (Swinburn et al. 2015). Harmonising these perspectives and providing consistent messages across the large number of systems relating to obesity is essential to bring about environmental change to modify obesity-related behaviour (Hawkes et al. 2015; Roberto, Swinburn et al. 2015).

1.2.3 Summary

Government regulation is essential to initiate a shift in behaviour and reverse the epidemic (Swinburn et al. 2011). The World Health Organisation provides the blueprint for national governments to act, and highlights that a cohesive package of policies, including legislative tools and regulatory policies, is required. To date, the Australian Government has prioritised low-level, voluntary or self-regulated approaches which emphasise individual responsibility. Public health advocates continue to appeal for government accountability in view of the rising burden of obesity in Australia and ongoing inaction by government (Mitchell, 2017).

1.3 Barriers to obesity policy adoption in Australia

'Let me remind you. Not one single country has managed to turn around its obesity epidemic in all age groups. This is not a failure of individual will-power. This is a failure of political will to take on big business.' Dr Margaret Chan, Opening address at the 8th Global Conference on Health Promotion. Helsinki, Finland. 2013.

Obesity has been described as 'policy resistant', due to the difficulty of understanding the complex contributing systems that have been created, and our capacity to address them with policy (Finegood et al. 2010; Sterman 2006). Policy decision making by government is not always a linear or rational process, often deviates from expert health opinion and to varying degrees is influenced by advocacy (Carter 2010, Cullerton et al.,2016b) . When this irregular process is applied to the complexity of obesity systems, 'policy cacophony' occurs and decisions are forsaken (Lang & Rayner 2007). Therefore, despite the heightened awareness of obesity as a global crisis, and the proliferation of advocacy toward policy implementation, there is political difficultly in successfully addressing the pandemic.

The framing of obesity policy underpins many of the barriers to implementing action to address obesity (Roberto et al. 2015). Conflicting stakeholder views on action to address the obesity epidemic become polarised through the emergence of stark dichotomies, which act as points of disagreement between stakeholders about the determinants of obesity. One of the core dichotomies which influences disagreement is whether one views obesity, from an individual or systemic perspective. This contributes to diverse perceptions around the necessity of government intervention to address obesity, and consequently presents several barriers to government regulation.

There are a number of identified barriers to implementation of public health policy. Recent findings have provided valuable insight into those with greatest relevance to government regulation for obesity prevention and have highlighted potential policy determinants (Crammond et al. 2013; Huang et al. 2015; Mitchell et al. 2011; Shill et al., 2012a; Shill et al. 2012b). Further assessments of how these determinants influence the policy process and ultimately obesity-related policy decisions have identified fundamental barriers to government action (Clarke et al. 2016; Cullerton et al. 2016a; Lyn et al. 2013). Roberto and

colleagues (2015) have summarised these as: scarcity of intervention evidence, powerful lobbying (primarily driven by the food industry), an absence of political will, and a lack of public support or pressure from civil society (Roberto et al. 2015). Each of these primary barriers to government regulation, driven by the framing of obesity, may be strengthened by interrelations with one another.

1.3.1 Evidence, will and resistance

Evidence for complex public health intervention

In a political environment with conflicting interests, policy makers can be constrained by a lack of evidence; a recognised barrier to government policy development and implementation (Brownson et al., 2009; Cullerton et al. 2016a; Lang & Rayner 2007). The process of gathering evidence for public health policy is fraught with difficulty on account of the complexity of the systems influencing complex public health problems (Sterman, 2006). Potential strategies to generate meaningful evidence within these complex systems has recently been proposed (Brownson et al., 2009; Craig et al. 2008; Petticrew & Roberts 2003; Rychetnik et al. 2004; Sterman, 2006). There remains a paucity of evidence for the effectiveness of obesity policy (Mayne et al. 2015; Sacks et al. 2008), although it has been claimed that published evidence on the effect of obesity interventions generally has little relevance to policy makers anyway (Kite et al., 2015).

In order to generate evidence to fill the 'gaps', research interventions must be implemented. This leads to a vicious cycle, in the case of population-level policies, where there is inadequate evidence to justify population-level intervention in a research context, which further inhibits evidence generation (Crammond et al., 2013). Evidence obtained via highly-controlled trials has been considered irrelevant to real-world obesity policy, and the execution of pragmatic research in a population context, is hampered by ethical barriers and feasibility concerns (Yoong et al., 2014). Attempts have been made to improve the relevance of research outcomes to health-related policy decisions and encourage the translation of scientific findings to politics (Choi et al., 2016; Fielding & Briss, 2006; Kite et al., 2015; Yoong et al., 2014), yet 'optimal' evidence remains elusive. Hence, regardless of the significance of findings when evidence is generated, policy change may still not be established where political and public will is lacking (Cullerton et al. 2016; Fielding & Briss,

2006). Nevertheless, the urgency of an effective response to obesity raises questions of how 'complete' evidence must be to justify implementation and the extent to which non-experimental data should be considered (Petticrew & Roberts 2003; Rychetnik et al. 2004).

In the context of this debate, more pragmatic forms of evidence for policy decision making have been proposed (Carter 2010; Carter et al. 2011). Considering the lack of more traditional evidence, and the urgency of the obesity crisis, it is considered important to contemplate alternative forms of evidence derived from pragmatic trial designs or that toward other outcomes, aside from empirical data on weight status (Carter et al., 2011). The suggestion that evidence of effectiveness itself may not be significantly influential to policy adoption (Clarke et al., 2016), further enhances the value of alternative forms of evidence. It provides scope to explore other powerful influencers to policy adoption, and provide tools to support those policies which are most hampered by evidence inadequacy high-level regulation which are most hampered by evidence inadequacy, for examples policies proposing high level regulation. Consequently, other important components including; public support, political will and industry influence, can be considered.

Public resistance toward infringements to freedom

There is an abundance of government imposed regulations in today's society. Since the first public health regulations to protect society against cholera, the government has regulated to reduce the risk of a wide range of behaviours to improve public health. In Australia, legislation has been enacted to impose age limits for alcohol consumption, smoking restrictions, mandate seatbelts and cycle helmets and implement building regulations which have been successful in achieving the targeted behaviour and reducing related mortality and morbidity. These protective interventions have been widely accepted, despite limited preceding evidence of effectiveness and an initial degree of societal resistance; with their place in society now appearing somewhat obvious.

Despite these successful examples of Australian regulatory public health policy, regulations proposed in the form of policies to address obesity are subject to societal resistance. Public acceptability is greater for regulations which target issues with a longer history such as tobacco, alcohol and road-safety policies over those relating to obesity (Diepeveen et al. 2013). Acceptability is predicted to vary with time post-implementation, with resistance

waning over time as attitudes adapt. Regulation also appears to be more acceptable when directed at children, and to those not engaging in the target behaviour (Diepeveen et al. 2013). Furthermore, government-led public health interventions which restrict or eliminate choice are considered less acceptable than those which merely provide information to guide choice (Branson et al., 2012; Diepeveen et al. 2013; Petrescu et al., 2016). To effectively address complex public health issues, policies need to target the whole population, and do more than merely inform choice as an independent strategy (Brimblecombe et al.,2017; Capewell & Lloyd-Williams 2017; Sobol-Goldberg et al., 2013). In the past, where there has been a lack of empirical evidence for government regulations to reduce smoking, and road traffic accidents, decisions have been justified through political will and leadership which have led to implementation progress. These examples demonstrate that public preference for informative interventions or child-targeted programs has not hampered policies that aim to reduce risks to public health; obesity is an exception.

Freedom

Political ideology is an important influencer to policy adoption and shapes individuals views on government regulation (Clarke et al. 2016; Shill et al., 2012). The debate around government regulation for obesity prevention policy is currently dominated by neoliberal perspectives which shift narrative about government intervention toward deregulation and a personal responsibility approach (Clarke, 2004). These dominant views are recognised to hamper the implementation of potentially effective strategies.

For obesity policy, advocacy is often centred on the ethical concerns about government interference or 'intrusion' to individual choice (Crammond et al., 2013; Jochelson 2006; Magnusson 2015; Nuffield Council 2007). This mainly hinders the adoption of policies that are considered most 'intrusive' (such as regulations which restrict access to unhealthy food), given the demand for the benefits to outweigh potential costs to liberty (Nuffield Council 2007). Consequently, governments tend to adopt the least coercive policy instruments when prioritising policy options (Linder & Peters 2008). Ethical considerations are important to protect the state from unintended and potentially harmful consequences of policy, and to ensure that benefits outweigh any potential for harm. A number of ethical frameworks have been developed and applied, to serve this purpose.

Ethical considerations may be particularly useful where evidence for effectiveness is unobtainable, however the majority of ethical frameworks in public health are underpinned by the concept of 'freedom'. Freedom is subject to variable accounts, in some part perceived according to individual perceptions of the current environment, and influenced by personal interpretations of autonomy and liberty (Barnhill 2013; Buchanan 2013; Griffiths & West 2015; Thaler & Sunstein 2003; Thaler 2008). Given that the interpretation of freedom is influenced by many factors, including ones' position on the spectrum of political ideologies, it is difficult to represent as a standardised concept within rigid ethical frameworks. Despite valuable findings identified within the literature, what constitutes individual 'freedom' in the context of today's obesogenic environment is a debatable and highly complex topic.

The Nuffield Ladder of Intervention is a key reference in public health ethics, and presents public health interventions in a hierarchal order from those which promote liberty, to those which bring about greatest cost to liberty. Public health interventions are classified as rungs representing low to high levels of 'intrusiveness'. The Ladder itself is underpinned by Mills' harm principle, which defines freedom as the absence of legal or 'social coercion' (Mill 1859). Mill suggests, *'that the only purpose for which power can be rightfully exercised over any member of a civilised community, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant'*. As a result, the Ladder presents a non-interference conception of freedom, which assumes that any government interference or 'intrusiveness' can only be justified where the benefit to health outweighs the cost to freedom.

The viewpoint of the Ladder also makes clear that the health benefit of government intervention must be indicated by evidence, and thus research must generate sufficient evidence to satisfy this requirement before implementation. Interventions classified by the lower rungs of the Ladder are informative, educational strategies, and other low-level interventions which facilitate choice, such as the provision of free fruit in schools. These interventions are proposed to require the least evidence to justify implementation, and have been the form of most interventions implemented, and evaluated to date. These low level interventions have also been demonstrated to be the least effective strategies in the context of obesity prevention (Sobol-Goldberg et al. 2013; Waters et al., 2011), and although their value within a comprehensive obesity strategy is recognised, their effectiveness as stand-alone

interventions is relatively low (Brimblecombe et al. 2017; Capewell & Lloyd-Williams 2017).

Conversely, the Ladder viewpoint considers that those interventions classified at the upper end of the Ladder require greatest level of evidence to justify implementation (Nuffield Council 2007). To date, their application in research as well as policy has been limited and, the evidence to support these interventions is lacking. Modelling and exploratory research studies conducted at settings level have provided some promising findings, however their application to pragmatic research, conducted at population level is restricted. The implementation of these interventions which guide choice through incentives and disincentives and restrict choice within certain settings (at least) is increasingly recognised as essential in addressing obesity on a national and global scale. However, the Nuffield classification of these options as 'intrusive' subjects these interventions to ethical and evidence barriers to implementation, to a greater extent than those classified as least intrusive (Table 1.1)

In this regard, the Ladder impedes the application of potentially effective strategies, which subsequently hinders the generation of adequate evidence to inform policy decisions by government. Given that the Ladder design is underpinned by Mills' position on liberty, it assumes that nothing can promote liberty to a greater extent than no intervention. However, Nuffield's interpretation of Mills position has been subject to criticism, with critics asserting that the Ladder inadequately represents Mills classic definition of liberalism (Griffiths & West 2015).

Griffiths and West (2015) highlight several limitations to the Ladder due to Nuffield's attempt to summarise 'intrusiveness' for practical application. They highlight that non-coercive interventions may be appropriate, even in line with Mills' principle, and that those targeting children and adults with impaired capacity to make a decision may be justifiable (Griffiths & West 2015). The researchers propose that government intervention, to a degree, may be *required* to make autonomous decisions, and put forward a number of reasons to reject the linear structure of the Ladder. They instead propose a Balanced Ladder model (Table 1.2). Their modification classifies public health interventions according to the relative impact on autonomy, and suggests that considerations of "autonomy" rather than 'intrusion' may reframe interventions in a positive way, to improve support for public health action.

The Balanced Ladder viewpoint is significant given the evidential barriers to implementation of intrusive interventions which are suggested by the Nuffield Ladder. The Balanced Ladder supports an alternative view that interventions which simultaneously enhance health and autonomy require no special justification. Only those interventions which enhance health but reduce autonomy, require evidence of benefit to outweigh the cost to autonomy. The Balanced Ladder provides a valuable contribution to the literature and provides an opportunity to advance policy adoption in the context of obesity prevention. However, the concepts proposed remain under contention of the food industry; a third highly relevant barrier to progress.

Table 1.2: Description of the different categorisation levels of the Nuffield Ladder and Balanced Ladder of intervention, with examples

Nuffield Ladder level (intrusiveness)	**Balanced ladder level (impact on autonomy)**	**Pooled level of impact on autonomy (5-level)**	**Pooled level of impact on autonomy (3-level/ direction)**	**Example description**
Eliminate	-4	-2 Diminish	*Autonomy-negative* *(reduces autonomy to varying extent)*	*Eliminate choice* - Regulate in such a way as to entirely eliminate choice, for example through compulsory isolation of patients with infectious diseases.
Restrict	-3			*Restrict choice* - Regulate in such a way as to restrict the options available to people with the aim of protecting them, for example removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants.
Disincentives	-2	-1 Reduce		*Guide choice through disincentive* - Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example through taxes on cigarettes, or by discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.
Incentives	-1			*Guide choice through incentive* - Regulations can be offered that guide choices by fiscal and other incentives, for example offering tax-breaks for the purchase of bicycles that are used as a means of travelling to work.
Do nothing	0	0 Neutral	*Autonomy-neutral* *(no or very little impact on autonomy)*	*Do nothing or simply monitor the situation*
Change the default	0			*Guide choice through changing the default policy*- For example, in a restaurant, instead of providing chips as a standard side dish (with healthier options available) menus could be changed to provide a more healthy option as standard (with chips as an option available).
Inform	+1	+1 Increase	*Autonomy-positive* *(increases autonomy to varying extent)*	*Provide information* – inform and educate the public, for example as part of campaigns which inform people of the health benefits of specific behaviours.
	+2			*Educate for autonomy* – For example through a media studies curriculum which shows children how to recognise the techniques used to manipulate choice through marketing or by banning marketing primary targeted at children.
	+3	+2 Enhance		*Ensure choice is available* – For instance, by requiring that menus contain items that someone seeking to maintain healthy would be likely to choose.
Enable	+4			*Enable choice* - Enable individuals to change their behaviours, for example by offering participation in a NHS 'stop smoking' programme, building cycle lanes, or providing free fruit in schools.
	+5			*Collective self-binding* – for example, a decision by a community, after debate and democratic decision making, to ban the local sale of alcohol.

1.3.2 Industry resistance

Industry is powerfully represented in food and health-related policy decisions (Clarke et al. 2016, Cullerton et al. 2016b). The financial growth and power of industry has led to an environment where policy makers lack control over advertising, marketing and availability of unhealthy food products (Lang & Rayner 2007). Commercial interests have been demonstrated to influence policy decisions around food and physical activity-related issues, but mostly there is strong evidence to suggest that 'Big Food' has played an integral role in derailing policies which have been proposed, and in some cases implemented, in the interest of public health (Bodker et al. 2015; Brownell & Warner 2009; Chan 2013; Kelly et al., 2016). Therefore, the lack of progress in implementing effective policies to prevent obesity and non-communicable disease has been attributed to the powerful political influence of the food industry (Chan, 2013; Nestle 2013).

A conflict of interest occurs when a secondary interest overly influences a primary interest (Lo et al., 2009). The obvious example of conflict of interest amongst industry perspectives influencing policy decisions is that of financial interest. This is particularly concerning as policy decisions which prioritise the financial interests of industry, are highly unlikely to bring about the greatest benefits for public health (Lesser et al., 2007, Lundh et al., 2012, Nestle 2013a, Nestle 2016b); and thus risk undermining the potential effectiveness of public health strategies. In Australia this has been demonstrated by the relegation of regulatory policy proposals to industry-regulated and voluntary initiatives.

Recent advocacy in the Australian context, has highlighted the substantial influence of industry in shaping national obesity-related policy. The findings of a review into progress over the past 20 years emphasised the impact that industry perspectives have had in slowing policy action (Swinburn & Wood, 2013), and highlighted the influence of commercial interests toward the latter phases of policy adoption. A concept presented by Swinburn & Wood (2013) demonstrates a progressive shift in dominant influences across the policy process. Their model of progression indicates greater public health influence at the early development phase, and greater industry influence at the later action phase, which suggests a dilution of public health approaches at the implementation stage (Swinburn & Wood 2013).

The explanation by Swinburn & Wood provides a valuable insight into the vulnerable stages

of the policy process where vested interests are most likely to be influential. Where industry efforts act as a barrier to policy progress, intervention is required to ensure that stakeholders from diverse perspectives are equally represented at these integral stages of the policy process. It is useful to understand the common techniques which are employed by industry, in order to reduce their power and rebalance the debate.

The food industry use a portfolio of effective tools to influence nutrition and food policy (Cullerton et al. 2016b; Nestle 2013b; Nestle 2016a; Popkin & Slining 2013) and a number of strategies employed specifically by the Australian food industry have been highlighted (Mialon et al., 2017). These effective tactics have been noted to strongly align with those employed by the tobacco industry (Brownell & Warner 2009; Mialon et al. 2017; Popkin & Slining 2013), and recent success in tobacco control demonstrates that intercepting on these tactics, with strong political leadership and public support may advance progress to address obesity (Reitsma et al., 2015). The 'information strategy', whereby messages are framed to favour the priorities of commercial interests, is particularly concerning (Mialon et al., 2017), given that framing and messaging have been suggested as a powerful influencer to policy adoption (Clarke et al., 2016, Cullerton et al., 2016). This strategy is suggested to be actioned through a number of channels, including the lobbying of policy makers, promoting the economic importance of industry and industry funded or implemented research for public health intervention (Nestle 2013a, Nestle 2016b, Mialon et al. 2017).

The role of industry in shaping evidence is concerning given that evidence on effectiveness is prioritised by decision-makers. Large food and beverage companies have funded academics from well acclaimed backgrounds to become 'merchants of doubt' to discredit the value of research, create uncertainty in the evidence and fuel the growth of barriers toward government accountability and action (Lo et al., 2009; Newton et al., 2016; O'Connor 2015; Popkin & Slining 2013). Industry sustains various health organisations by way of research funding and events sponsorship, which strengthens industrys' relationships with those in influential positions (Cullerton et al. 2016b). Commercial conflicts of interests amongst academics may lead to bias in the development, implementation and evaluation of research and these vested interests have been shown to significantly influence the outcomes of research published in the context of food policy (Bes-Rastrollo et al., 2013). The translation and dissemination of illegitimate research findings contributes to strategies to inform practice, and have strong implications for policy decisions.

Framing of diet and health related issues is another information strategy used by industry which is particularly effective given that the narrative around policy options highly influences policy adoption (Clarke et al. 2016). Public support and political will play an integral role in successful policy adoption, and the dominant role of industry in influencing the will of these stakeholders, through framing, has been confirmed (Clarke et al. 2016, Cullerton et al. 2016a, Cullerton et al. 2016b, Mialon et al. 2017, Nestle 2013a, Nestle 2016b). Priorities of health and commercial gain rarely align, and therefore careful attention is required to balance the objectives of public health whilst minimising resistance from commercial interests (Elliott-Green et al. 2016). Effective framing driven by commercial priorities encourages polarised perspectives and strengthens the dichotomy of individual versus systemic views on the issue, which in turn contributes to disagreement and subsequently inaction.

The advocacy position of commercial interests has been shown to explicitly support an individual responsibility approach to obesity prevention (Elliott-Green et al. 2016; Niederdeppe et al. 2013) and to position government-led regulation to protect public health as inherently intrusive to individual freedom through the analogy of a 'nanny state' (Jochelson 2006; Magnusson 2015). These tactics align with Nuffield's definition of 'intrusiveness', which assumes that any intervention imparts a cost to liberty and intrudes on individual choice (Nuffield Council, 2007). In contrast, public health experts suggest that environmental policies at systems level is the only way to bring about meaningful change to reduce obesity (Swinburn et al. 2015). In this regard, it may be valuable to seek the perspectives of stakeholders who prioritise public health, independent to those of industry, in an effort to better balance public interests to accelerate progress (Jones 2015, Mialon et al. 2017).

1.3.3 Stakeholder power and engagement in research and policy

An imbalance in stakeholders capacity to inform policy decisions is widely recognised (Cullerton at al., 2016b, Lewis 2006, Nestle, 2010). The findings of a recent network analysis of stakeholder influence on food-policy decisions in Australia, indicate significant differences in stakeholder groups' capacity to directly influence policy, even amongst those perspectives assumed to be adequately represented (Cullerton et al. 2016b). The results show that the food industry hold a powerful position for informing policy decisions in Australia

(which is emphasised in 1.3.2), and where academics have the opportunity to contribute to policy direction via research publications, government funding, and media platforms their views may also be considered well represented (Lewis, 2006, The Daily Telegraph, 2015, The Conversation, 2017). The individual perspectives of academics are disseminated in high-profile, open access journals as opinion pieces which represent individual academic views, not only primary research findings (Smith 2016). Further, academics (through their institutions) commonly have links with decision makers, and have the opportunity to inform decisions through research outputs funded by the government (e.g. NHMRC). The public or 'consumers' by contrast are underexploited in policy decisions (Huang et al.,2015). Bringing forward their perspective is integral to meaningful research outcomes (Boivin et al.,2914, Oliver et al., 2004) and collaborating with policy makers may result in more successful translation of research to obesity policy (Choi et al., 2016, Oliver et al, 2014). A transition in policy development is therefore required, and innovative methods to include underrepresented stakeholders, such as health professionals, as individual perspectives, and parents or consumers, may be appropriate given their mutual long term goals.

The James Lind Alliance advocates the value of patient-centred practice for identifying research gaps regarding treatment for health conditions. Their approach, termed 'Priority Setting Partnerships' (PSP) was developed to bring the perspectives of the patient, carer and practitioner together, in isolation of vested interests, through transparent methodology, to identify treatment uncertainties which are important to both groups (Cowen 2013). The underlying principles of the PSP method, such as enabling transparency, enhancing consumer voice and reducing the influence of industry in decision making, are relevant to the development of a framework to prioritise obesity policy in Australia (Cowen 2013). As the public are underexploited in policy decisions (Huang et al. 2015), bringing forward their perspective is integral to meaningful research outcomes (Boivin et al. 2014; Hanley et al., 2004; Oliver et al. 2004; Phulkerd et al. 2016) and collaborating with policy makers may result in more successful translation of research to obesity policy (Choi et al. 2016).

The value of multi-stakeholder engagement in public health research is recognised by the Vienna Declaration (McKee 2016) and WHO's global strategy for the prevention of NCDs (WHO, 2013). Consequently, research methods which encompass public engagement and facilitate practitioner and public lead research agendas are becoming increasingly popular (Boivin et al. 2014; Cowen 2013; Hanley et al., 2004; Huang et al. 2015; Oliver et al. 2004;

Oliver et al., 2006; Stirling et al., 2007; VicHealth 2016; Wilson et al., 2014). Research supports the feasibility of involving a diverse range of stakeholders' perspectives in complex policy decisions (Boivin et al. 2014) and specifically those which aim to create healthy environments (Phulkerd et al. 2016). Hence, where evidence for effective intervention is lacking, stakeholders' opinions are highly valued by experts and may alleviate policy maker concerns about the ethics of implementing policies with little evidence. Where stakeholder involvement has the potential to outdo the theoretical classification of policies, it is a useful adjunct to inform policy decisions (Juntti et al. 2009).

In the context of obesity policy, the Foresight report (2007) (Government Office for Science 2007) emphasised the importance of stakeholder engagement in government decisions as one of five core principles for tackling obesity. Stakeholder engagement has since underpinned a series of research investigations at local (VicHealth. 2016), national (Food Foundation, 2016; Hawkes et al. 2014, Sacks et al., 2017; Swinburn et al., 2014) and continent level (Millstone & Lobstein 2007), and is becoming a central focus of research around evidence-based policy prioritisation for obesity prevention. A number of methods have been used to facilitate collaboration between various perspectives across large geographical areas. Methods include consensus-building techniques such as multi-criteria mapping and Delphi methodology, independent surveys, one-to-one interviews, and face-face collaborations in the form of focus groups and round tables (Crammond et al. 2013; Faulkner et al. 2011; Hawkes et al. 2014; Neri et al. 2015; Nilsen et al. 2006; Stirling et al., 2007). Such studies have predominantly aimed to explore views of stakeholders about potential interventions, to predict societal response. The investigations have delivered valuable insight into stakeholders preferences for policy adoption, however it has been suggested that dominant perspectives are represented to a greater extent at the most critical stages of the policy process (Swinburn & Wood 2013).

Public involvement in the policy debate is essential (Rychetnik et al. 2014). Regulation and legislative tools are required to effectively address obesity, and public demand for government to use these instruments is fundamental to support their implementation (Huang et al. 2015; Marteau et al. 2015; Roberto et al. 2015; Swinburn et al. 2005). Engaging consumers in the debate regarding policy interventions may enhance support for policy implementation (Douglas et al., 2014), and as a result, research methods which seek to explore consumers' perspectives are increasingly valued to identify publically acceptable and population-relevant strategies.

Various methods have been employed to gain consumer or patient perspectives in public health priority setting, including community juries (Degeling et al. 2015; Hawkes 2012; Paul et al., 2008; Rychetnik et al., 2013; Rychetnik et al. 2014; VicHealth 2016), survey-style questionnaires (Sivananthan et al., 2013) and randomized controlled trials (Boivin et al. 2014). The findings suggest that consumer-involvement may enhance satisfaction in the policy process, promote accountability and facilitate democratic decision-making (Wilson et al., 2014). The growing literature on consumer-involved research and policy decisions suggests that public engagement can not only alter priorities, but produce more relevant and feasible priorities compared to those developed by practitioners or policy makers alone (Boivin et al. 2014), and therefore may be of greater value than methods which soley seek 'expert' opinion. In recent years, the public have become an increasingly valued in healthcare decision making and attitudes have shifted toward a more holistic definition of the term 'expert' in health research practice, to encompass those who are 'expert' through experience as well as those through certification (Collins 2002; Florin & Dixon 2004; Uhm et al., 2012).

1.4 Summary

Government regulation and policy action is required to reverse the trend in obesity. There is a lack of empirical data, and little capacity to generate evidence on the effectiveness of government led obesity-related policy. The most 'intrusive' regulatory strategies require high level evidence to justify implementation (Crammond et al. 2013; Nuffield Council 2007). However, political will from the Australian Government may overcome these evidence-related limitations, and drive regulatory action to address obesity (Crammond et al. 2013).

To improve political will for action there must be harmonised cohesive support from stakeholders, and mobilisation of public support, in particular, is essential. It has been suggested that commercial influence are central to polarised beliefs and are currently the dominant voice in obesity, specifically food-related, policy decisions in Australia. Lessons based on other public health issues have supported the theory that behaviour change in response to regulation may precede a change in attitude (Festinger, 1957). Therefore, a 'leap of faith' maybe required and tools which assist governments to consider how ethically appropriate it is to intervene, despite a lack of evidence, may be valuable.

The Balanced Ladder has been proposed as a potentially valuable tool for improving the framing of policy options and subsequently enhancing public and political will for policy adoption (Griffiths & West 2015). However, the Ladder is yet to be used in primary research to analyse stakeholder preferences for obesity-related policy action. By meeting the research objectives, this thesis aims to explore the Balanced Ladder in the context of obesity prevention policy, to contribute evidence to improve political will to address obesity in Australia.

'In the view of WHO, the formulation of health policies must be protected from distortion by commercial or vested interests.' Margaret Chan, Helskini, 2013.

CHAPTER 2: RESEARCH AIMS AND OBJECTIVES

2.1 Preamble

The following chapter briefly highlights the key points presented in chapter one, and respectively outlines the aim and objectives of the research program.

Chapter 1 emphasised the urgent need for population-wide change in dietary and activity behaviours is required to reverse the trend in obesity, and that government-led obesity-related policy has been identified as essential in leading this shift in behaviour. The degree of influence that evidence of effectiveness has on policy adoption is questionable (Clarke et al., 2016), and alternative methods, such as stakeholder advocacy, may be more powerful facilitators or barriers to policy change. Advocacy that opposes government-led regulatory policy, is centred around the ethical concern of government intrusion to individual choice. The concepts of intrusiveness and autonomy, defined by the Ladder and Balanced Ladder frameworks, can be considered measures of policy influence on individual choice.

2.2 Research paradigm

The research outlined in this thesis employs a dual critical- interpretive approach. The dual approach prioritises the perspective of stakeholders, their knowledge and views using a qualitative process (Deetz, 1982) to explore the concept of 'intrusiveness' as predicted by ethical frameworks. The critical approach allows the research to challenge the 'norm' to encourage societal support to address obesity (Neuman 2011, Crotty, 1998) . A deductive approach was employed whereby the theoretical frameworks, which underpin the research question and corresponding objectives was pre-defined. In the context of this research, the qualitative research process is shaped by the theoretical perspective of libertarian paternalism, *'...an approach that preserves freedom of choice but that authorises both private and public institutions to steer people in directions that will promote their welfare'* (Thaler & Sunstein., 2003) which is discussed in Chapter One. In developing the research program, aims and objectives, the researcher reflects on the dimensions of equality and autonomy (Barnhill & King., 2013) and continuums of agentic and structural approaches as described by agency-structure sociological theory (Jary 1991).

2.3 Aim

This research aims to explore the relevance of the two concepts, intrusiveness and autonomy, in driving the barriers to policy adoption, and propose a priority setting framework, informed by stakeholder consensus, that considers the ethical values of intrusiveness and autonomy to support mobilisation of obesity policy. In doing so, this thesis aims to address the lack of research into how the concepts of intrusiveness and autonomy are perceived from the perspective of stakeholders in the context of obesity prevention policy, and contribute to the growing movement around research methods for stakeholder (particuarly consumer) engagement in policy decision making.

Specifically, this thesis aims to answer: *How are stakeholder perspectives of obesity-related policy options influenced by the concepts of intrusiveness and impact on autonomy?*

2.4 Research objectives

The following seven objectives are proposed to answer the research question and meet the overarching aim.

2.4.1 Objective 1

Explore an association between the concepts of intrusiveness and autonomy, and the effectiveness of interventions.

2.4.2 Objective 2

Identify the levels of intrusiveness and impact to autonomy, recommended by stakeholders to government policy decisions.

2.4.3 Objective 3

Explore the concepts of autonomy and intrusiveness as a point of similarity and/or difference between stakeholder groups in recommending government policy options.

2.4.4 Objective 4

Explore consensus amongst underrepresented stakeholders in classifying the policy intrusiveness and impact on autonomy, of food-related policy options for the Australian Government.

2.4.5. Objective 5

Explore consensus amongst underrepresented stakeholders on perceived effectiveness and level of priority of food-related policy options in the Australian context.

2.4.6. Objective 6

Identify potential contributors to individual perception of policy intrusiveness and impact on autonomy to improve understanding of how obesity policy can be better framed.

2.4.7 Objective 7

Develop a practical framework to illustrate how stakeholder perspectives of intrusiveness and autonomy could be considered in the context of obesity-related policy decisions.

2.5 Application

Table 2.1 defines the research methods which will be applied to address the seven objectives and contribute to the aim of this research project.

Table 2.1: Project outline and application of research methods to address the research objectives

Research objective	Research method	Data analysis techniques	Chapter	Specific study objective
1. Explore an association between the concepts of intrusiveness and autonomy, and the effectiveness of interventions	Scoping review	Quantitative: Meta-analysis	3	To assess the relevance of 'intrusiveness 'and 'autonomy' to school-based obesity prevention interventions, this review aimed to determine the feasibility of categorising published trial interventions through the Nuffield framework, and secondly identify whether the levels account for the variance in the effectiveness of, and heterogeneity among, interventions reported in published trials.
	Systematic review	Quantitative: Meta-analysis	4	To assess the benefits and harms of beverage positioning interventions on sugar-sweetened beverage purchase and consumption.
2. Identify the levels of intrusiveness and impact to autonomy, recommended by stakeholders to government policy decisions.	Document analysis	Qualitative: Content analysis Quantitative: Descriptive statistics (Frequencies, Chi squared).	5	To explore the feasibility of classifying stakeholder policy submissions, made directly to government, according to their impact on individual autonomy, and to consider the application of the concept to government-led obesity policy adoption.
3. Explore the concepts of autonomy and intrusiveness as a point of similarity and/or difference between stakeholder groups in recommending government policy options.	Document analysis	Qualitative: Content analysis Quantitative: Descriptive statistics	5	To identify the similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy.

		(Frequencies, Chi squared).		
4. Explore consensus amongst underrepresented stakeholders in classifying the policy intrusiveness and impact on autonomy, of food-related policy options for the Australian Government.	Policy Delphi technique	Quantitative: Statistics to calculate consensus and convergence (Median, IQR, relative IQR)	6	To explore consensus on the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, of obesity-related food policy options, from the perspective of consumers, practitioners and policy makers in Australia. *Objectives:* 1.Identify the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for a range of policy options representing the levels of the Nuffield Ladder of Intervention (the Ladder), according to participants. 2.Identify the degree of consensus amongst participants, regarding perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for each policy option. 3.Compare participants' classification of policy intrusiveness and impact on autonomy with the classifications according to two ethical frameworks (the Ladder [15] and Balanced Ladder [21]).
5. Explore consensus amongst underrepresented stakeholders on perceived effectiveness and level of priority of food-related policy options in the Australian context	Policy Delphi technique	Quantitative: Statistics to calculate consensus and convergence (Median, IQR, relative IQR)	6	
6. Identify potential contributors to individual perception of policy intrusiveness and impact on autonomy to improve understanding of how obesity policy can be better framed.	Policy Delphi technique	Qualitative: Directed content analysis.	7	To identify potential contributors to individual perceptions of these concepts, to understand the reasons for differing perspectives and conflict with group consensus.
7. Develop a practical framework to illustrate how stakeholder perspectives of intrusiveness and autonomy could be considered in the context of obesity-related policy decisions.	The framework will be informed by the collective findings of all studies conducted and aims to practically apply the findings in the context of other research and current policy.			

CHAPTER 3: SCHOOL OBESITY PREVENTION: AN ANALYSIS OF THE INTRUSIVENESS OF INTERVENTIONS

3.1 Preamble

A manuscript entitled *'School-based obesity prevention: A review and meta-analysis of the intrusiveness of interventions'* is currently being drafted into a publishable format and will be submitted to Obesity Reviews for peer-review in June 2017. The results of the analysis have been disseminated at international and national conferences (section xvi; appendix 3.1).

3.2 Introduction

Evaluations of intervention effectiveness are essential to identify the most effective approaches to obesity prevention. Chapter 1 highlighted the complexity of implementing population-wide public health interventions to generate evidence, and the consequent focus on settings-based explanatory trials. The findings of these trials are valuable in providing evidence which is relevant to specific settings, however, systematic reviews and meta-analyses have presented particularly heterogeneous results (Sobol-Goldberg et al.,2013; Waters et al., 2011;Wolfenden et al., 2016). It is essential that novel platforms are considered to categorise and analyse existing interventions to explain the variability in the effectiveness of obesity prevention interventions (Craig et al., 2008; Sacks et al., 2009).

Chapter 1 also introduced the concept of intrusiveness as a barrier to policy adoption, as well as a potential alternative tool to effectiveness for evaluating policy options. This proposal remains largely underexplored. Policy approaches which have the least impact on liberty and equity may be less effective than those with greater impact (Fox & Horowitz 2013). However, given the lack of evidence for the effectiveness of restrictive population-wide policies, this assumption remains hypothetical.

Effectiveness of school policy

Schools are the setting for a large proportion of obesity prevention intervention research, owing to the feasibility and relative acceptability of implementing public health interventions to children (Diepeveen et al.,2013). The pedagogic nature of the school facilitates educational strategies, whilst the organisational structure and regulatory environment provide relative feasibility over other settings for implementing restrictive interventions (Cleland et al.,2013 ; Chriqui et al., 2014). Consequently, the school setting provides a relevant platform for evaluating interventions which span the Ladder framework (Nuffield Council 2007).

Given the wealth of school-based research, a number of systematic reviews have already been conducted (Sobol-Goldberg et al., 2013). These have found a consistently high -level of heterogeneity amongst these interventions (Mei et al., 2016; Sobol-Goldberg et al., 2013) and therefore sub-analyses have been conducted in an attempt to identify the most effective components of interventions to shape future practice. Generally, subgroup analyses have indicated increased effectiveness on BMI from interventions which are long term (implemented for a year or more), (Khambalia et al., 2012; Mei et al., 2016) deliver physical activity and dietary components simultaneously, (Khambalia et al., 2012; Mei et al., 2016) and those which include a family or home *and* community component (Bauman et al, 2016; Khambalia et al., 2012). These indications are encouraging, however the overall effectiveness of the interventions remains moderate (Sobol-Goldberg et al., 2013). There is limited pragmatic evidence on which to base policy recommendations and to implement the findings of these reviews, thus evidence for an optimal school-based strategy remains elusive.

In spite of this, the school remains a well-utilised setting for experimentation in public health. Systematic reviews offer a comprehensive pool of data for analysis to assess the relevance of ‘intrusiveness ’and ‘autonomy’ to school-based obesity prevention interventions.

Aim

This review aimed to determine the feasibility of categorising the intrusiveness and impact on autonomy of published trial interventions using two frameworks. The secondary aim was to identify whether level of intrusiveness accounts for the variance in the effectiveness of, and heterogeneity among, interventions reported in published trials.

3.3 Method

A structured review was conducted to explore the concept of intrusiveness through a homogenous sample of school-based obesity prevention interventions. In contrast to the aims of systematic review methodology, this review did not aim to derive a total effect size for all relevant interventions, and therefore a sample of pre-identified, high quality trials was deemed sufficient to pilot the concept. Published systematic reviews provide a comprehensive database of relevant trials, and have been previously used as an inclusive sampling strategy to identify relevant references in the widely-published area of obesity, and therefore this strategy was adopted for the current study. (Khambalia et al., 2012)

Search methods for identification of studies

A structured search to obtain published systematic reviews on school-based obesity prevention trials was conducted in MEDLINE, EMBASE and Cochrane Library CENTRAL database (Appendix 3.2). The search identified syntheses of reviews from which relevant systematic reviews were obtained (Khambalia et al., 2012). Further relevant reviews were identified through hand searching the reference lists of included reviews. References for the trials included in each review provided the studies for eligibility assessment.

Selection of studies

Each trial was assessed against pre-specified eligibility criteria to ensure that the data extracted was similar with regard to the PICO elements (Table 3.1) in an attempt to reduce heterogeneity (Wang et al., 2013). This allowed for investigation of the intervention components, including categories of 'intrusiveness'.

Table 3.1: Inclusion criteria

	Inclusion criteria
Study design	Randomised or cluster-randomised controlled trials.
Population	School children 3-18 years.
Intervention	Any intervention with the primary objective of preventing obesity* and implemented primarily within the school setting.**
Comparator	No intervention
Primary outcome	Mean difference in BMI or BMI Z-score between intervention and control group at follow up. Studies which reported measures at baseline and follow up were included.
Duration	A minimum of 6 months from baseline to follow up.

* Eligible studies were those reporting obesity *prevention* interventions and therefore only those where children were *not* recruited according to weight or other measure of weight status (Brown T, 2009).
**In some cases such interventions were delivered outside of normal school hours due to time constraints (Nader, 1999) and therefore interventions which took place before, during or after school hours, within the school setting were included.

The inclusion criteria was designed to ensure that included trials were likely to implement interventions across the full spectrum of levels of the Ladder framework, whilst simultaneously reducing heterogeneity from other confounding components. The settings-based criteria targeted school-interventions, which were justified as the most acceptable, feasible, and subsequently prolifically implemented intervention. (Cleland et al., 2013; Diepeveen et al., 2013; Waters et al., 2011). There is debate regarding the most appropriate study design to provide adequate evidence for population-wide public health interventions (Craig et al., 2008; Yoong et al., 2014), however the settings approach allowed for cluster-randomised controlled trials to enable comparison of change at end-point and provide age and sex matched controls through recruitment of equivalent year groups.

Measurement of the primary outcome of interest was considered essential given the modified search methodology to meet the study aim. Therefore, studies were included if they reported BMI, BMI Z-score. Secondary outcomes were defined as prevalence of overweight or obesity, or body fat percentage. Studies which involved indirect methods of assessment, such as self or parent-reported weight or BMI, were not included due to the risk of inaccuracy associated with these methods. (Himes et al., 2009).

Data collection and analysis

During an initial screen trials were excluded by title and abstract by one reviewer. Trials were excluded if the study design was not a randomised or cluster-randomised controlled trial; was less than 6 months from baseline to follow up; inlcuded participants over the 18 or under three years of age; did not report BMI or BMI Z-score as an outcome measure or were not implemented within the school setting. Further, given the focus on obesity prevention, trials which recruited participants according to a measure of weight status (e.g. obese children only) the trial was deemed ineligible. Where the title and abstract did not provide the required detail, the full text was obtained and reviewed by two reviewers to enable an informed assessment for eligibility. The full text for 250 records was obtained and screened by two reviwers (EH, RH) against the inclusion criteria (Table 3.1).

Data extraction and management

All data regarding the effect size and the level(s) of intrusiveness of intervention were extracted independently, by two reviewers (EH, DR). A data extraction guide including exemplars was used to guide the objective classification of interventions by the Ladder framework (appendix 3.3). Intervention details and outcome data was extracted from trial reports.

The levels for categorising interventions are defined in appendix 3.3. In short the six levels for categorisation were: inform choice, enable choice, guide choice by changing the default, guide choice through incentives, or disincentives, and restrict choice. The seventh level of the Ladder framework, 'Eliminate choice', was not used and reflects the unlikely nature of such intervention for food and physical activity. Additionally, the levels of the Ladder framework were collapsed to identify interventions which positively or negatively influence autonomy according to the Balanced Ladder framework (Griffiths & West., 2015). Risk of bias was assessed for all studies included in the meta-analysis, using the Cochrane's Risk of Bias Tool (Cochrane Collaboration, 2011).

Measures of treatment effect and unit of analysis issues

As a result of non-equivalent outcome measures across child obesity studies, it was considered inappropriate to pool all data (Waters et al.,2011) and therefore, a meta-analysis

was conducted only on those interventions with similar outcomes. The effect on BMI (age and sex standardised), was identified as the most commonly reported and appropriate outcome measure for analysis to ensure results were not skewed by the natural fluctuations of BMI due to growth (Must & Anderson., 2006; Simmonds et al., 2016).

The continuous nature of BMI as an outcome measure enhanced the importance of a control comparator to further reduce the influence of growth on the results. Consequently, the measure of effect was defined as the mean difference in change, between groups, at end-point. Results from studies ineligible for the meta-analysis were descriptively analysed.

The meta-analysis was performed using Review Manager software. The generic inverse variance method and random effects model were used due to the diversity in subjects, interventions and outcomes reported and enabled inclusion of data reported in variable formats (Gloy et al., 2013; Waters et al., 2011).

Dealing with missing data

Data conversion calculations were used for data expressed in subgroups or without standard deviations (Cochrane Collaboration, 2011). For studies which included several intervention arms of varying levels of intrusiveness, the results were treated separately and the number of participants in the control group divided accordingly.

Assessment of heterogeneity

Existing meta-analysis of similar trials report heterogeneity amongst results (Waters et a., 2011). The inclusion criteria for this review aimed to reduce other study variables, except for level of intrusiveness, so that any reduced heterogeneity within sub-groups could indicate intrusiveness as an influential component to effectiveness of intervention; hence the assessment of heterogeneity was essential to meet the objective of the review. The I^2 statistic was used to interpret heterogeneity within and between subgroups and P-value was used to assess sub-group differences (<0.05 indicated significance) (Borenstein et al., 2009).

Subgroup and sensitivity analysis

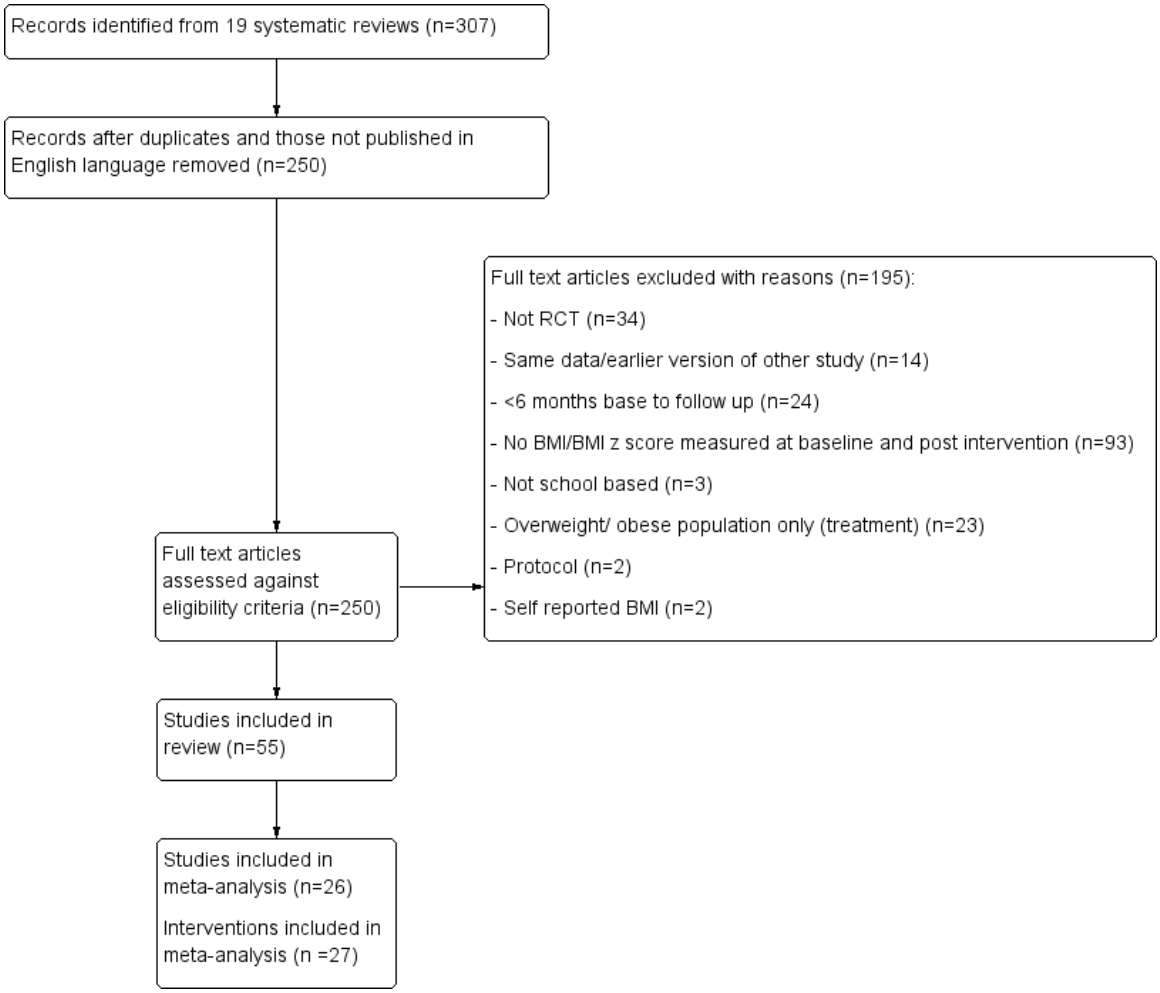
Data was sub-grouped according to the classified level of intrusiveness. Where the outcome of multiple interventions of varying intrusiveness were reported collectively, the highest level employed was used for categorisation. Sensitivity analysis was conducted on the sub-groups with high heterogeneity to explore the reasons. The number of levels of intrusiveness employed by the intervention was investigated, in addition to the target behaviour.

3.4 Results

Results of the search

The search identified 19 systematic reviews on school-based obesity prevention trials. English language trials included in the reviews were recorded, and de-duplicated, which resulted in 307 studies for assessment. Fifty-five studies, representing 56 interventions were included in the final review and 27 were eligible for inclusion in the meta-analysis. Excluded studies were recorded with reasons (Fig. 3.1).

Fig.3.1: PRISMA flow-chart.


Records identified from 19 systematic reviews (n=307)
Records after duplicates and those not published in English language removed (n=250)
Full text articles assessed against eligibility criteria (n=250)
Full text articles excluded with reasons (n=195):
- Not RCT (n=34)
- Same data/earlier version of other study (n=14)
- <6 months base to follow up (n=24)
- No BMI/BMI z score measured at baseline and post intervention (n=93)
- Not school based (n=3)
- Overweight/ obese population only (treatment) (n=23)
- Protocol (n=2)
- Self reported BMI (n=2)
Studies included in review (n=55)
Studies included in meta-analysis (n=26)
Interventions included in meta-analysis (n =27)

Characteristics of included studies

With regard to the highest level of intrusiveness implemented; eight studies reported interventions which informed choice, seven reported those which enabled choice, five which guided choice through incentives and 38 which restricted choice. Changing the default was not the highest level of intervention employed by any study; but was used within combined interventions which also implemented higher levels of intrusiveness. No study reported interventions which guided children's choice by providing disincentives. Eight studies implemented interventions targeting nutrition or dietary change only, 13 solely targeted physical activity or sedentary behaviour and 35 implemented a combination of nutrition and physical activity interventions. Of those which included a physical activity component, eight delivered an educational intervention only, 16 solely implemented a practical component and 20 delivered a combination of educational and practical physical activity.

Effectiveness

Twenty-seven studies reported data in a format from which the mean difference in change in BMI between intervention and control could be calculated; a measure reported in high quality reviews of similar studies (Waters et al., 2011). Analysis of the combined studies suggested that school-based obesity prevention interventions may be moderately effective in reducing standardised BMI (-0.23 [-0.31, -0.15] (kg/m^2)). Furthermore, those which targeted both dietary and physical activity related behaviour change simultaneously, were more effective (-0.34 [-0.49, -0.18] (Z=4.28 (P =0.001)) than those which focused on a single behaviour (-0.11 [-0.18, -0.05] (Z=3.56 (P=0.0004)).

Included interventions could be categorised by five of the seven levels of intrusiveness, defined by the Nuffield Ladder. Several studies employed more than one level within a multi-component strategy and were therefore sub-grouped by the highest level they employed; this provided sufficient data to pool the findings for four levels of intrusiveness. Individually, the least effective intervention was reported by Sichieri et al (0.10 [-0.06, 0.26]) which exclusively informed choice. In contrast, the most effective intervention study by Angelopoulos (-1.20 [-1.36, -1.04]) restricted choice, but simultaneously implemented across the spectrum of intrusiveness by informing, enabling and guiding choice through incentives.

Figure 3.2 illustrates an insignificant combined effect amongst interventions which solely informed choice (n = 4). Interventions which enabled (n=5), incentivised (n=3) or restricted (n=16) choice demonstrated a relatively similar, modest effect size when sub-grouped by their level. Interestingly, when the outlier (Angelopoulos 2009) was removed from those which restricted choice, the effect size of those included in this sub-group was significantly reduced (-0.13[-0.19,-0.07]), suggesting interventions which enable and incentivise behaviour change are more effective than those which inform or restrict choice.

The data was also explored in accordance to the target behaviour of intervention. Lower level interventions which targeted nutrition and physical activity simultaneously, were no more effective than those only targeting one behaviour (-0.17 [-0.35, 0.01]; -0.19 [-0.31, -0.06]). However, when a restrictive component was added, interventions focusing on both behaviours generated a greater effect over those targeting one behaviour (-0.35 [-0.60, -0.09]; -0.11 [-0.17, -0.05]). Furthermore, those which restricted choice of one behaviour are the least effective when pooled (0.08 [-0.14,0.03]).

A sensitivity analysis was conducted on those which simultaneously targeted both diet and physical activity behaviours, in isolation from those which targeted a solo behaviour. The distribution of number of studies across the levels of intrusiveness reflected that of the primary analysis, however, those which enabled choice to healthy diet and physical activity were considerably more effective (-0.50[-1.48,0.48]).

A second analysis explored the difference in interventions effectiveness when sub-grouped by their impact on autonomy (Fig.3.3). Interventions were categorised as ‘autonomy-positive’ (n=9) or ‘autonomy-negative’ (n=19) according to the Balanced Ladder framework (Griffiths & West, 2015). The outlier (Angelopoulos 2009) was removed to further explore the changes in heterogenity which may have been attributed to the scale of intervention (as proposed in section 3.3). Where the outlier implemented across the full spectrum of the Ladder framework it was considered that the effectiveness may be confounded by the number of levels rather than the impact on autonomy. When removed, heterogneity was reduced and there was very little difference in effectiveness of those which positively and those which negatively influence autonomy. A sensitivity analysis on those which simultaneously delivered combined interventions (dietary and activity-related) showed a greater effect size for those which positively influence autonomy (-0.27[-0.50,-0.04]) than those which negatively influence autonomy (-0.20[-0.30,-0.10]), however both effect sizes were modest.

*Heterogeneity***.**

The analysis indicated a high level of heterogeneity among the studies (I2=88%). Of all the sub-groups, those which restricted choice were particularly heterogeneous (I2=92%); therefore, sensitivity analysis was conducted within the subgroup. The greater the number of levels of intrusiveness simultaneously employed, the greater the effect on outcome (-0.33 [-0.50, -0.15]; -0.39 [-0.75, -0.02]) for those implementing more than two; and four or more levels respectively. However, this does not explain the heterogeneity within the sub-group (I2= 94%; 97% respectively). Two studies (Kriemler 2010, Donnelly 2009) restricted choice as the only level implemented, and when pooled produced the lowest effect size (-0.09[-0.19,0.00]) Z=1.89 (0.06)) but reduced heterogeneity (12 =26%). Amongst those which restricted choice, those which informed choice simultaneously were more effective (-0.27 [-0.44, -0.09]), than those which did not (-0.11 [-0.18, -0.05]).

Descriptive analysis of all included studies

Results from studies which were not eligible for inclusion within the meta-analysis broadly aligned with the findings of the meta-analysis. In particular, across all included trials, the majority of those interventions which provided incentives to guide choice, in isolation, or as part of a more intrusive strategy, demonstrated a significant effect over the control groups as reported by trial authors (Foster 2008, Coleman 2005, Angelopoulos 2009, Manios 2002, Peralta 2009, Salcedo Aguliar 2010, Simon 2008, Neumark-Sztainer 2009, Barbeau 2007).

Fig 3.2: Mean difference in change in BMI; sub-grouped according to the highest level of the Ladder (Nuffield Council) employed.

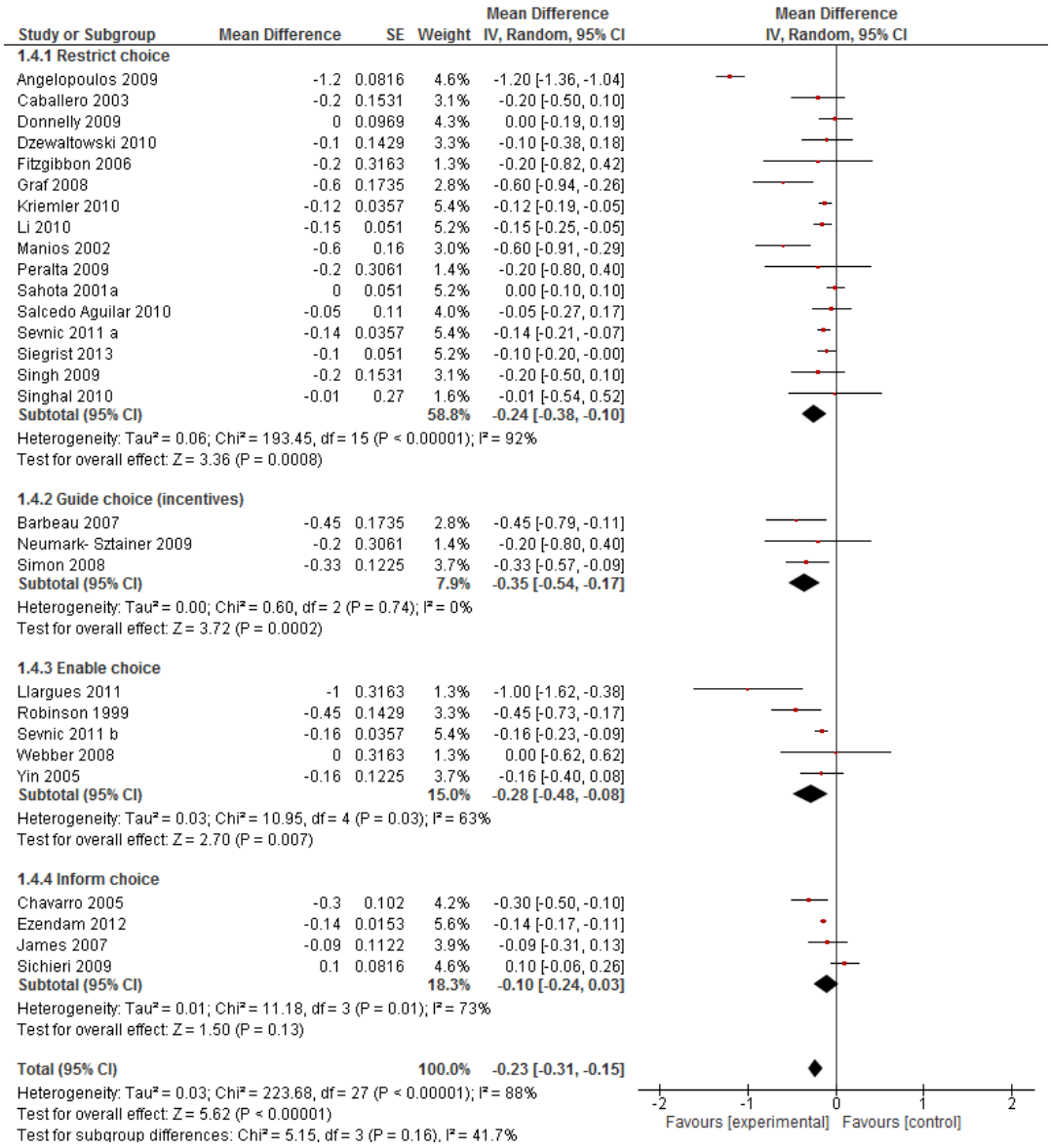
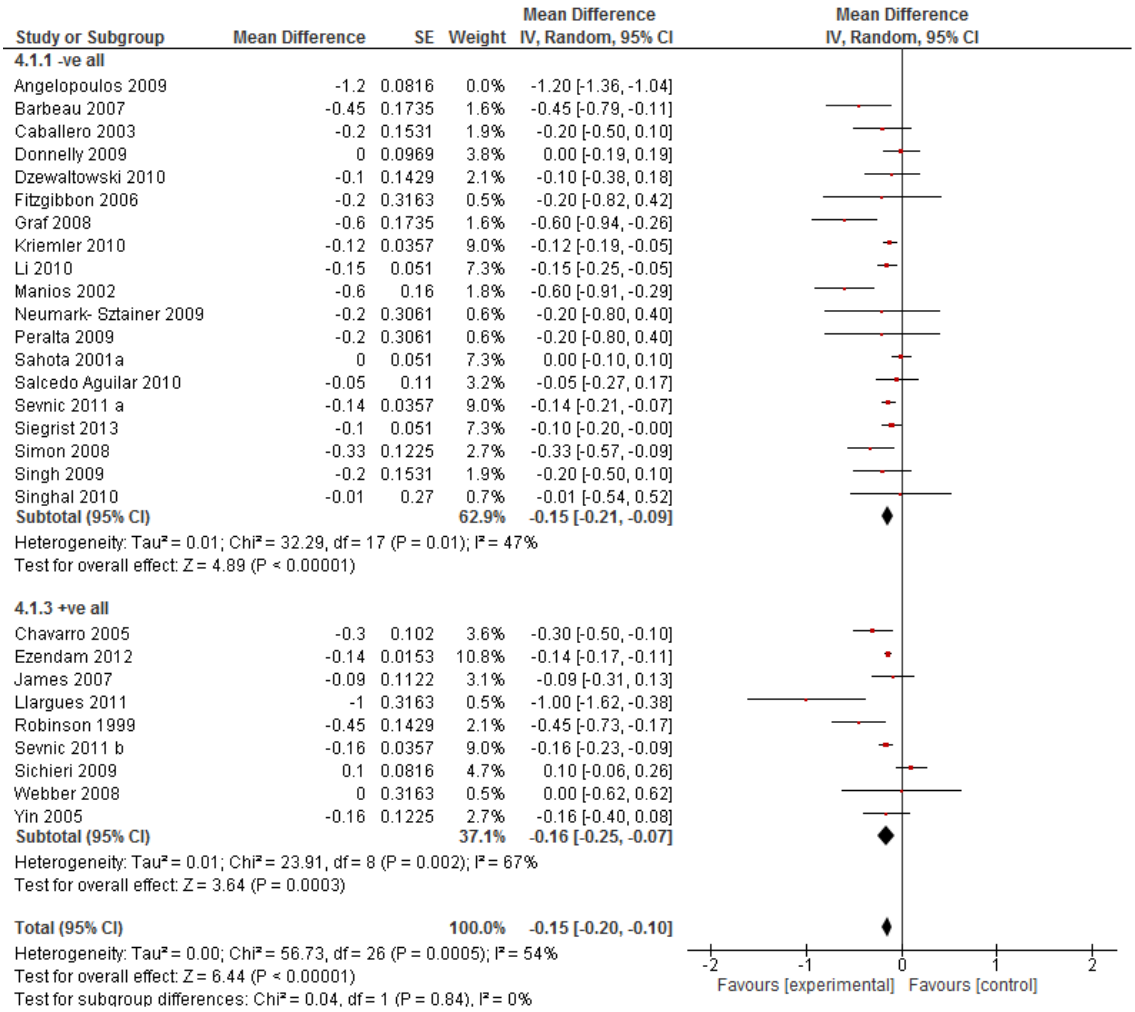


Fig 3.3: Mean difference in change in BMI; sub-grouped according to the Balanced Ladder (Griffiths & West 2015).



3.5 Discussion

Relevance of intrusiveness

This review aimed to determine the feasibility of classifying school-based obesity interventions by their level of intrusiveness to choice and their influence to individual autonomy. Furthermore, it aimed to explore any association between the intrusiveness and the effectiveness of interventions on obesity prevention. The key findings are presented in Box 3.1, and suggest that school-based obesity prevention trials employ strategies of various levels of intrusiveness and impact on autonomy. The relevance of the Ladder and Balanced Ladder in classifying these interventions indicates the potential utility of theses frameworks

as tools to analyse ethical consdierations alongside the evidence of effectivness of school-based obesity prevention trials.

The school interventions implemented a spectrum of strategies from informing to restricting choice, which encompassed several levels of the Ladder and components of proposed policy frameworks. Informative interventions were amongst the most commonly implemented across the trials and 86% of interventions informed choice through an educational component. However, restrictive interventions were also common (64%) which supports the school as an appropriate setting for implementing high level regulation. The school setting lends itself to implementing mandatory nutrition and health education, and therefore is a particularly appropriate setting for the learning of healthy behaviours (Hawkes et al 2015). Furthermore, the regulatory school environment and the relative acceptability, feasibility and support for child-targeted interventions creates an appropriate setting for implementing restriction to choice (Cleland et al., 2013; Diepeveen et al., 2013; Douglas et al., 2014; Lloyd et al., 2014; Millstone & Lobstein 2007), and thus facilitates the implementation of comprehensive strategies. However, high level regulation is unlikely to be included in reviews of community wide trials, which to date have focused predominantly on low level, educative interventions owing to the ethical and geographical challenge of restricting choice.

Effectiveness

The reduced heterogenity expressed within sub-groups suggest that the level of intrusiveness of these interventions may explain some of the variation in effect size of school-based interventions which target multiple behaviours. However, a greater volume of homogeneous data is required to confirm this observation. The key findings regarding effectiveness indicate that informing choice may be less effective than more intrusive interventions (classified by the Ladder) and those which influence autonomy, positively or negatively, to a greater extent. However, educational interventions may increase the effect size of higher level restrictive strategies. The most effective school-based interventions may be those which implement across several levels of the Ladder simultaneously, or those which provide incentives to guide individual's choice. However, for those which address diet and activity behaviours simultaneously, enabling choice may be most effective.

Previous research supports the notion that educating in school in isolation is less effective than more intrusive strategies (Sobol-Goldberg et al., 2013).However, this may not be

generalisable to the wider community where higher level interventions targeting adults may stimulate greater resistance and hamper sustained effect (Diepeveen et al., 2013). This was starkly illustrated by the poorly sustained implementation of restrictions to soda serving size in New York City, which was withdrawn following public resistance and industry lobbying (Kelly et al., 2016). In this regard, the value of education to support concurrent restrictive interventions is acknowledged in public health practice and emphasised by theories of capacity building and community engagement to enhance societal support for successful public health interventions (Baillie et al., 2009; Hughes, 2012). Education may have a fundamental influence over the mechanisms which are likely to bring about obesity-related behaviour change (Hawkes et al., 2015) and therefore may provide the foundation for implementing feasible, acceptable and sustainable policy change when used in conjunction with other interventions.

Incentivising healthy choice was identified as the most effective level of intrusiveness according to this analysis. This approach is classified as moderately intrusive according to the Ladder classification, and therefore may sufficiently influence choice behaviour without stimulating the resistance shown toward highly restrictive strategies. It has been suggested that incentives are widely acceptable public health intervention strategies, (Diepeveen et al., 2013) and in the context of obesity, considered an appropriate component of preventative policy from public health and commercial perspectives (Hawkes et al., 2013; Millstone & Lobstein, 2007). The form of incentive can be tailored with relative ease to suit the values of the target population and therefore may offer opportunity for individualised strategies. In schools, incentives could directly target children to encourage healthy choice, incentivise parents or teachers to provide a healthy environment for behavioural preferences, or target industry or state and local governments involved in school food provision to prioritise obesity-related behaviours when developing the curriculum and the schools built environment. Consequently, incentive strategies have the potential to impact several points of influences for behaviour change, (Hawkes et al., 2015) and at wider population-level, fiscal interventions which provide financial incentives to encourage healthy choices may be effective to address obesity; however, their impact across socioeconomic gradient is a point of ethical debate (Backholer et al., 2016).

The results suggest that the greater the number of levels employed, the more effective the intervention. Whilst this could be attributed to the ‘scale’ of intervention, it is not a factor

commonly considered in the development of obesity interventions. Largely, 'comprehensive' interventions refer to targeting multiple behaviours, across multiple settings, and various additional components have been suggested to intensify the effect size of school based interventions, i.e. involving parents, or providing positive reinforcement (Khambalia et al., 2012; Sobol-Goldberg at al., 2013). However, the value of combining interventions with multiple levels of intrusiveness to enhance effectiveness is a novel approach to 'sophisticating' obesity intervention development. Whilst the increments in effect size may directly relate to the scale of intervention, we suggest that this supports the Ladder as more than an ethical framework, but a valuable tool for planning comprehensive, effective obesity interventions that employ a spectrum of mechanisms for change (Hawkes et al., 2015).

Heterogeneity

The complex nature of obesity prevention trials delivers particularly confounded comparisons, and investigating child-populations through variable outcome measures of effect enhances the diversity of findings in research efforts. It is widely acknowledged that such studies are subject to great heterogeneity (Khambalia et al., 2012; Waters et al., 2011), and therefore interpreting the results of this review in the relevant context of wider research is necessary.

For trials included in the meta-analysis, the interventions that restricted choice showed greatest heterogeneity. Some independently restricted choice by mandating physical activity within compulsory physical education lessons, whilst others employed strategies across the full spectrum of the ladder simultaneously. Therefore, the scale of interventions within the subgroup of those which restricted choice, varied to a greater extent than those classified at lower levels. As restricting choice is suggested to be more acceptable and feasible if supported by informative strategies, (Diepeveen et al., 2013) this may have contributed to the diversity in effectiveness of those classified as restrictive. Regardless, the findings suggest that this multi-level approach is feasibly implemented in the school setting.

The target behaviour may also explain the heterogeneity amongst studies which included restrictive interventions. The majority of restrictive interventions were activity focused, which are likely to represent a plethora of potential prescriptions of varying intensity, duration and form of exercise and therefore it is unremarkable that effectiveness was relatively diverse. A sensitivity analysis on this category indicated that generally, targeting

diet and activity behaviours simultaneously was more effective than focusing on one. Those which simultaneously targeted diet and exercise at low levels of intrusiveness were more effective than restrictive strategies that only targeted physical activity. This supports the questionable effect of physical activity intervention as an independent approach to obesity prevention and treatment (Pontzer et al., 2016), and of education-only interventions which solely target diet-related behaviours on BMI (Herbert et al., 2014).

Including data from various time points may have increased the heterogeneity of results, however the decision to include the longest term data available for these trials was justified by the importance of sustained effect. A simple sensitivity analysis was conducted on studies which published long and short term outcomes. The change to the pooled effect size and heterogeneity was negligible (-0.24 [-0.38,-0.10] Z= 3.38 (I2 = 92%); -0.24 [-0.38,-0.10] Z= 3.45 (I2 = 92%)), and therefore this was unlikely to be a potential influence.

Influence on Autonomy

There is ethical concern about the extent to which governing bodies should influence individual choice, and therefore the review also explored any benefits or limitations to prioritising autonomy-negative or -positive interventions with regard to their effectiveness. Those which only employed autonomy-positive strategies were slightly more effective than those which negatively influenced individual's autonomy. This suggests that where restriction is poorly accepted or unfeasible, similar effects may be obtained by adequately enhancing individual's autonomy through, for example, environmental change.

Within the regulated and confined school environment, interventions which enhance autonomy to the greatest extent may be more achievable than in a community setting. Although further investigation is required to explore the variation in effectiveness of autonomy positive or negative interventions on other settings, the current study supports the value of the school in providing an environment that enhances autonomy for healthy choice and subsequently encourages healthy preference learning.

3.6 Strengths and limitations

This study presents a novel approach to evaluating obesity prevention interventions. It is the first study to classify interventions from RCTs by their intrusiveness and impact on autonomy and to explore an association with effectiveness.

A settings approach was justified by the nature of the school in facilitating intrusive intervention, however there is controversy regarding the most valid and reliable method for determining weight status for children and subsequently large heterogeneity in measures employed to assess intervention effectiveness (Griffiths et al., 2012; Mast, 2002; Must et al., 2006; Waters et al., 2011; Wickramasinghe et al., 2005). Consequently, studies were excluded by outcome (Himes et al., 2009; Must et al., 2006) which limited the data available for analysis, and resulted in several under-powered sub-groups. A similar investigation into adult-targeted interventions may provide a larger pool of data, but may not represent interventions which span the full spectrum of the Ladder.

Successful obesity interventions are likely to simultaneously implement several complimentary interventions which are classified by different levels of intrusiveness. Despite this, it is valuable to identify independent components which are associated with most effective outcomes, to support policy makers and practitioners to develop effective strategies. The classification of multi-level strategies by the framework may be considered a limitation to this review given that increments in effect size may directly relate to the scale of intervention. However, we suggest that this supports the Ladder as more than an ethical framework, but a valuable tool for planning comprehensive, effective obesity interventions and classifying a number of potential stratgeies that employ a spectrum of mechanisms for change (Hawkes et al., 2015). It is important to consider the findings of this review as one potentially influential component to intervention effectiveness. A series of well regulated, RCTs which employ various levels of the Ladder in isolation, and combination, would provide greatest insight, but may be feasibly and ethically challenging (Yoong et al., 2014). However, there is scope to evaluate these complex interventions through meta-regression analysis to explore any additive effect of simultaneously employing interventions of different levels of intrusiveness.

Finally, this analysis classified interventions by the level of intrusiveness to individuals or the ‘consumer’. However, the classified level of intrusiveness toward industry may influence

industry support for intervention, which may contribute to the success of intervention (Bodker et al., 2015; Kelly et al., 2016). Therefore, further investigation into the effectiveness of interventions which are classified by different levels of intrusiveness to other stakeholder groups may provide a valuable insight into barriers to intervention success.

Box 3.1: Summary of key findings

- Level of intrusiveness may explain some of the variation in effect size of school-based interventions. However, a greater volume of homogeneous data is required to verify this observation in this population.
- It is feasible to categorise school-based obesity interventions by their level of intrusiveness, and therefore the Ladder could be used to 'sophisticate' complex intervention development and evaluation.
- Enabling choice may be the most effective level of intervention for stimulating diet and activity change simultaneously in school; and therefore enhancing autonomy to the greatest extent may be most successful.
- Interventions that independently inform choice may be less effective than influencing autonomy to a greater extent, however, when restricting choice, simultaneously informing choice may be more effective.
- Interventions which guide choice through incentives may be most effective level of intrusiveness to individual choice in schools.
- Interventions that employ more levels may be more effective and combining 4 or more levels of intrusiveness may be the most effective overall.
- Autonomy-positive and autonomy-negative school-based interventions may generate a similar effect size.

3.7 Conclusion and implications of findings

The concepts of intrusiveness and autonomy are relevant to school-based obesity prevention interventions, and the findings of this study indicate a potential association between intrusiveness and effectiveness, however, a larger pool of homogeneous data is required to

confirm this finding. The school is a feasible setting for implementing interventions across variable levels of intrusiveness and impact on autonomy, as defined by the Ladder and Balanced Ladder frameworks, including those relatively intrusive to children's individual choice. This validates the frameworks as potential platforms for sophisticating the evaluation and implementation of obesity prevention interventions.

The concepts outlined in this study warrant further investigation to determine their relevance to interventions outside of a structured and controlled setting, and an additional analysis to explore the intervention intrusiveness to other stakeholders may enhance the value of the Ladders for prioritising obesity interventions in practice.

CHAPTER 4: THE EFFECT OF MODERATE 'INTRUSION': NUDGING IN THE RETAIL ENVIRONMENT

4.1 Introduction

The first objective of this thesis is to explore an association between the concepts of intrusiveness and autonomy, and the effectiveness of public health intervention. Chapter 3 presented evidence to support the implementation of school-based interventions which are classified at the extremes of the Balanced Ladder framework. At population-level, the implementation of these types of intervention, which greatly enhance or greatly reduce autonomy, is limited; partly due to political resistance around population-wide regulations for which evidence of effectiveness is lacking (Chapter 1) (Marteau et al., 2011). Subsequently, there has been political interest towards interventions which are classified at the centre of both the Nuffield Ladder and Balanced Ladder frameworks (Cabinet Office Behavioural Insights Team, 2010; VicHealth, 2017). These are actions which aim to guide individual choice by *changing the default* (Griffiths & West, 2015; Nuffiled Council, 2007) or altering 'choice architecture' (Hollands et al., 2013).

Choice architecture interventions change the environment to sub-consciously cue healthier choice behaviours. The theoretical process is underpinned by the concept of libertarian paternalism (Chapter 1), and has been termed 'Nudge Theory' (Thaler, 2008). The Balanced Ladder classifies these nudge strategies as 'autonomy-neutral' interventions, in that they impart no or little cost to autonomy (Griffiths & West, 2015). A number of potential strategies which alter choice architecture have been defined and classified by a recently developed typology of actions (Hollands et al, 2013). This typology has encouraged a systematic and consistent approach across subsequent research Recent findings suggest that strategies which alter choice architecture effectively encourage healthy food choices amongst adults (Arno & Thomas 2016). However, there is a lack of specificity to review methods, and a need to identify the most effective choice architecture approaches to apply to specific policy settings, targeted populations and behaviours (Arno & Thomas 2016).

Sugar-sweetened beverages

Globally, the boldest policy actions which have been implemented by national governments to date, have focused on reducing the consumption of sugar-sweetened beverages (SSBs) given their significantly direct contribution to obesity and the global burden of disease (Lim et al., 2012; Malik et al., 2010; Malik et al., 2013; Mattes et al., 201;Te Morenga et al., 2013). Sugar sweetened beverages have been variably defined internationally. In the Australian context they are two defined classifications: (1) *sugar-sweetened beverages*, defined cordials, soft drinks, energy drinks, flavoured water and fruit or vegetable juices that contain added sugar, and (2) *intense-sweetened beverages*, defined as cordials, soft drinks, energy drinks and flavoured water which have been artificially sweetened (ABS, 2015a). For the purpose of this study, we encompass both definitions under the umbrella term SSB.

Policies to discourage SSB consumption have been fiscal in nature and implemented in the form of a levy on the total product or its sugar composition. Despite the position of financial disincentives as a less acceptable intervention (Petrescu et al., 2016) and resistance from commercial interests (Moise et al., 2011), similar fiscal policies have been implemented by several national governments (including Finland, Mexico, Hungary, France, Fiji, Belgium and several US states) and others have pledged to implement a tax over the coming months (including the United Kingdom, South Africa, Portugal and Ireland).

In Australia, SSB consumption is a public health concern. In 2006 Australia was one of ten countries with the highest SSB consumption in the world (Beverage Digest, 2006). The consumption of *intensely-sweetened* beverages has increased over the last 20 years and is highest in children and those living in areas of highest socioeconomic disadvantage (ABS, 2015a). The trend is attributable in part to effective marketing strategies; over half of all beverage advertising on Australian television promotes SSBs (Roberts et al., 2014).

Despite the international movement on levies to discourage SSB consumption, the Australian Government is yet to implement a tax. This is in spite of advocacy from public health organisations (Swan, 2017) and research findings that introducing price differentials at population-level may be effective to reduce obesity in high income (Cabrera Escobar et al., 2013) and middle income countries (Nakhimovsky et al., 2016). Short-term evaluations have generated encouraging findings suggesting the effectiveness of the tax on reducing purchase

and/or consumption (Colchero et al., 2016; Cabrera Escobar et al., 2013; Silver et al., 2017). However, evidence regarding the longer term effect on obesity and related chronic disease is limited (Cabrera Escobar et al., 2013), and primarily reliant on modelling study designs (Veerman et al., 2017). Given the resistance toward implementing the tax in Australia and the urgency of an effective strategy for obesity prevention, choice architecture approaches to target SSB consumption may be important considerations for policy makers. These strategies may be perceived as less intrusive (Nuffield Council, 2007), more acceptable (Petrescu et al., 2016) and of lesser impact on autonomy (Griffiths & West, 2015), and therefore implementation could be justified with incomplete evidence (Griffiths & West, 2015).

Setting and approach

Choice architecture interventions which aim to modify food environments can be implemented within retail micro-environments (Hollands et al., 2013). Such interventions which directly target the retailer, may be an effective and acceptable approach to nudge consumers toward healthier food purchases (Cameron et al., 2016; Hollands et al., 2013; Petrescu et al.,, 2016). Simple positioning or placement interventions, applied in the retail setting, are less likely to generate resistance from retailer, manufacturer and consumer perspectives than other more intrusive approaches (Huse et al., 2016; Petrescu et al., 2016), and have therefore been implemented in several retail environments including supermarkets and grocery stores (Adam & Jensen, 2016; Bucher et al, 2016; Cameron et al., 2016; Escaron et al., 2013). Systematic reviews of existing interventions have excluded those exclusively targeting beverages (Arno & Thomas, 2016; Bucher et al, 2016), included only supermarket or grocery store trials (Cameron et al., 2016; Escaron et al., 2013), or determined the combined effect of retail-level interventions (including fiscal strategies, and not limited to nudge interventions only) (Adam & Jensen, 2016). To date there has been no attempt to identify the specific and relative impact of independent choice architecture strategies (Hollands et al., 2013), which are implemented in retail settings and aim to influence SSB purchase and consumption.

Given the resistance to implement a SSB tax in Australia, and a preference amongst stakeholders for autonomy-neutral or positive interventions (Haynes et al, 2017), it is valuable to review the effectiveness of simple choice architecture interventions on SSB purchase and consumption to compare to current and prospective findings of fiscal

interventions. Furthermore, focusing on specific ways of altering choice architecture is essential to identify approaches which are effective whilst minimising the potential resistance to adoption by retailers. Positioning or placement interventions are simple, low cost and relatively easy interventions to implement across a range of retail environments, and therefore these were chosen for the purpose of this review.

4.2 Aim

The primary aim was to assess the benefits and harms of beverage positioning interventions, implemented in the retail setting, on sugar-sweetened beverage purchase and consumption.

4.3 Method

The protocol for this review was published through PROSPERO International prospective register for systematic reviews, to avoid duplication and demonstrate reliability in reporting and is available to access here (PROSPERO 2016:CRD42016046994) (Haynes et al., 2016).

Search strategy

A comprehensive search was conducted in the following electronic bibliographic databases: MEDLINE, CINAHL, EMBASE, Scopus, The Cochrane Library, PsycINFO and Pre-Medline. A detailed search strategy was developed (Appendix 4 (A4.1)), and included terms relating to the intervention to increase sensitivity. The preliminary search was developed in MEDLINE and adapted for use in other bibliographic databases. The search included all entries published until the start of the search (August 2016) and was filtered to human trials reported in the English language only.

Types of studies included

Randomized controlled trials (including quasi- and cluster-randomised trials) and pre-post experimental studies, conducted within a retail environment which compared a change in position or placement (specifically 'availability' and 'proximity') of SSB with a control group, and aimed to reduce sugar-sweetened beverage (SSB) purchase and/or consumption were included. Eligible studies must have measured and reported one or more of the

following: beverage choice, purchase, consumption, energy selection/consumption (in isolation from other food choice/purchase/consumption), or sales of SSB or other beverages. Eligible studies were published in peer-reviewed journals in the English language.

Table 4.1: Inclusion criteria for studies

Domain	Details
Participants/population	Trials which include adults and/or children regardless of body weight, gender or age.
Intervention	Trials which evaluated positional effects on beverage choice, purchase and consumption with the aim of reducing SSB purchase/consumption. For the purpose of the review this included interventions that applied nudge strategies to reduce unhealthy choice by changing the positioning/placement of beverages in the retail environment. Multi-intervention studies where at least one intervention/comparator group discouraged SSB purchase/consumption through altering positioning or placement of beverages in the retail environment were considered. Any change in position/placement must have been in isolation to other implemented strategies unless also present in the comparator group conditions.
Comparator	Eligible trials included one of the following comparators: a) no intervention control group (usual conditions). b) another form of intervention to reduce SSB purchase/consumption (for example, tax, labeling, education). c) another intervention/ experimental group (for example, swapping placement/positioning with healthier alternatives)
Outcome	Eligible trials included at least one of the reviews' primary outcome: **Primary outcomes:** Beverage choice; beverage purchase; beverage consumption; energy selection/consumption (KJ) in isolation from other food choice/purchase/consumption; sales of SSB or other beverages. **Secondary outcomes:** Increase in healthier choice (reduced overall energy (KJ)/increase other nutrient density). Attitudes to intervention (consumer/facilitator/manufacturer/retailer) including but not limited to acceptability, feasibility

Data extraction

All reports identified by the search underwent initial eligibility assessment using title and abstract. This was conducted independently by two reviewers (EH, SP). An inclusive approach was taken to ensure the process was sensitive to those which may report the specific intervention of interest and/or beverage choice/purchase within the full text. Reports which described any form of choice architecture intervention (Hollands et al.,2013) conducted within a retail setting, which aimed to alter beverage or food choice were included, unless it was made explicit that beverage choice was not measured as an outcome measure. The full text for each article which met eligibility criteria was obtained for full text assessment. Those for which eligibility was unclear also underwent full text assessment. Two reviewers then

independently conducted the assessment (EH, DR) and discrepancies were resolved via a third reviewer (SP). Where insufficient detail was provided, the study authors were to be contacted to determine eligibility. This step was not required for any studies identified by the search. Justification for ineligible studies was reported.

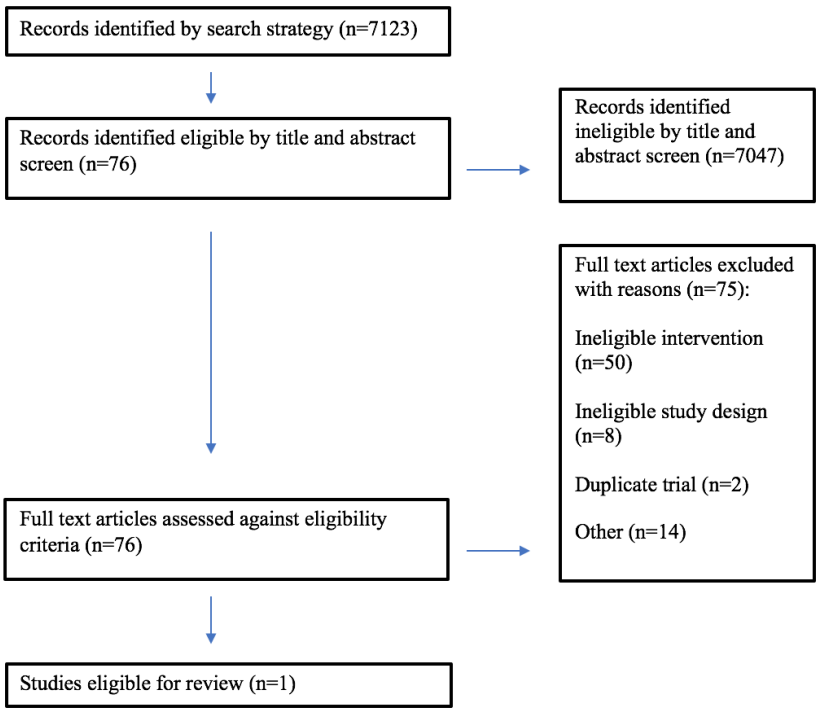
Quality assessment

Risk of bias assessment was planned in line with the Cochrane Collaboration risk of bias assessment tool. Two reviewers were to independently assess each study, and any discrepancies discussed between reviewers and, if necessary, a third reviewer. The overall risk of bias was to be reported as high, low or unclear and for each source of bias: selection, performance, detection, attrition and reporting bias.

4.4 Results

The search was conducted in September 2016 and the strategy identified 7123 records for eligibility assessment. All records were screened independently by title and abstract by two reviewers (EH, SP). From the initial screen 76 records were agreed for full text review. Two reviewers independently screened the full text of 76 records. The results of the assessment are illustrated in Fig 4.1.

Fig 4.1: PRISMA flow-chart of records identified by the search.



Seven reports were identified as potentially eligible and discussed by the review team. Six of the seven trials were deemed ineligible for reasons outlined in Table 4.2. One trial was identified which met the eligibility criteria for this review.

Table 4. 2: Potentially eligible articles discussed with review team

Study ID	Citation	Reason for exclusion	Detail
Thorndike 2012	Thorndike AN, Sonnenberg L, Riis J, Barraclough S, Levy DE. A 2-Phase Labeling and Choice Architecture Intervention to Improve Healthy Food and Beverage Choices. American Journal of Public Health. 2012. 102 (3). 527-533.	Ineligible intervention; not solely beverage positioning intervention.	Implement traffic light labelling for 3 months prior to product placement changes for 3 months.
Thorndike 2014	Thorndike AN, Riis J, Sonnenberg, LM, Levy DE. Traffic-Light Labels and Choice Architecture Promoting Healthy Food Choices. Am J Prev Med 2014;46(2):143–149.	Duplicate	Reports trial previously cited (Thorndike 2012).

Levy 2012	Levy DE, Riis J, Sonnenberg LM, Barraclough SJ, Thorndike AN. Food Choices of Minority and Low-Income Employees A Cafeteria Intervention. Am J Prev Med 2012;43(3):240 –248	Duplicate	Reports trial previously cited (Thorndike 2012).
Van Hulst 2013	Health-promoting Vending Machines: Evaluation of a Pediatric Hospital Intervention. Canadian Journal of Dietetic Practice and Research. 2013. 74;1.28-34.	Ineligible intervention; vending machines not considered retail environment for purpose of this review.	Implemented in hospital setting and changed the contents of 4 of 20 machines to healthy options only (the 4 are those in most prominent areas i.e. entrance lobby).
Foster 2014	Foster GD, Karpyn A, Wojtanowski AC, Davis E, Weiss S, Brensinger C et al. Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse neighborhoods: a randomized controlled trial1–3. Am J Clin Nutr 2014;99:1359–68.	Ineligible intervention; not solely beverage positioning intervention.	A multi-component intervention (simultaneously increased number of facings to promote product and had taste testing in store).
Wong 2015.	Wong MS, Nau C, Kharmats AY, Vedovato GM, Cheskin LJ, Gittelsohn J, Lee BY. Using a computational model to quantify the potential impact of changing the placement of healthy beverages in stores as an intervention to "Nudge" adolescent behavior choice. BMC Public Health. 2015.15:1284. DOI 10.1186/s12889-015-2626-0	Ineligible study design.	Eligible intervention but is a modelling study.
Visscher 2010	Visscher TL, van Hal WC, Blokdijk L, Seidell JC, Renders CM, Bemelmans WJ. Feasibility and Impact of Placing Water Coolers on Sales of Sugar-Sweetened Beverages in Dutch Secondary School Canteens. Obes Facts. 2010;3:109–115. DOI: 10.1159/000300848	Eligible.	

4.5 Discussion

This review aimed to assess the benefits and harms of beverage positioning interventions on sugar-sweetened beverage purchase and consumption in the retail setting. The findings

emphasise that there is a lack of research trials which have been conducted which investigate the impact of positioning and placement 'choice architecture' interventions on SSB purchase and consumption. The limited evidence meant that it was not possible to assess the effectiveness of these retail-level positioning strategies.

Effectiveness

Only one study was identified as eligible for inclusion. Visscher et al (2010) reported the findings of a pre/post design, non-randomised controlled trial which explored the effect of altering choice architecture on SSB sales amongst pupils (n=5866) attending six secondary schools in the Netherlands. The intervention was implemented in three schools and involved placing water coolers next to vending machines in school canteens; three schools were assigned as non-intervention controls. The findings suggest that independently providing free water in school has an insignificant impact on SSB sales (Visscher et al., 2010), which is supported by the findings of similar trials which were ineligible for this review, but explored similar interventions and outcomes (Loughridge et al., 2005 ;Muckelbauer et al., 2009). This suggests that combined nudge interventions which simultaneously educate pupils, or those which influence the proximity of the SSB product itself may be required to bring about a greater effect (Muckelbauer et al., 2009; Visscher et al., 2010).

This review attempted to identify the specific effect of placement interventions on SSB purchase and consumption. Several trials which were identified by the search but were ineligible as they implemented combined nudge interventions, employed alternative study designs or focused on food rather than beverage choice. These were ineligible for inclusion in this review, but the findings are relevant to the wider debate on the effectiveness of choice architecture interventions to reduce SSB consumption. It has been suggested that the effectiveness of placement interventions in encouraging healthier choices are enhanced when combined with promotional (Foster et al., 2014), informational (Thorndike et al., 2012; Hartigan et al., 2017), price (Adam & Jensen, 2016), or educational strategies (Muckelbauer et al., 2009) and the higher the number of approaches implemented, the greater the effect on choice (Olstad et al., 2014; Adam & Jensen, 2016). At population-level, local government policies which support access to healthier choice can significantly increase the availability of healthier options (Cradock et al., 2015), and when the findings of trials conducted across all settings, including laboratory-based research, are combined, a recent meta-analysis suggests

that choice architecture interventions are effective in altering food decisions, increasing the frequency of healthier choice (i.e. more nutrient dense, lower calorie/ salt/ sugar/ fat/ cholesterol) or changes in overall calorie consumption (Arno & Thomas, 2016). However, whether the effect of any of these trials is significant when independently reviewing the specific impact on *beverage* sales or consumption remains under question (Allan et al., 2015; Foster et al., 2014; Hartigan et al., 2017; Nakamura et al., 2014).

The results of the current study are inadequate to assess the effectiveness of placement strategies on beverage purchase and consumption. However, the identification of several relevant trials suggests that there is scope to broaden the eligibility criteria assigned by this review to explore the collective effect of interventions which employ combined nudge interventions. As the trials identified are particularly heterogeneous in strategy and design, it is important that future research employs a standardised approach to explore the independent and combined effect of retail interventions which alter choice architecture to promote healthier beverage choices.

Implications for research

Pragmatic research trials which implement tailored choice architecture interventions in the retail setting are required to inform policy decisions, but have been acknowledged as difficult to implement and reliant on retailer cooperation (Huse et al., 2016; Adam & Jensen, 2016). Interventions which target the food industry at retail level (such as placement and promotion interventions) have been suggested as more feasible than those which target the manufacturer (such as labelling and product reformulation). However the potential adverse impact on sales of the most profitable products, and potential for a breakdown of the relationship with manufacturers issues a risk for retailers which is widely underexplored by research (Adam & Jensen, 2016; Cameron et al., 2016). Given that manufacturers pay premium prices for retailers to place their product in salient positions, retailers have a financial interest in prioritising products provided by the wealthiest food companies (Klein & Wright, 2007). Subsequently the promotion of processed energy dense food and beverages are prioritised over fresh produce and healthier beverages (Cohen, 2016). The primary objective of the food industry is profit, and where there is no incentive or mandate to alter choice architecture, retail environments remain shaped to prioritise commercial financial gain over public health gain. To overcome these barriers, it is important to gain greater insight into retailer and

consumer acceptability of these interventions, and identify the key barriers to implementation of these strategies to advance progress (Adam & Jensen, 2016; Cameron et al., 2016; Hollands et al., 2013).

Collaborative research methods which engage multiple stakeholders are required to provide evidence for these strategies. The food industry has long-funded research on choice behaviour and marketing strategies to increase sales (Steinman, 2009; Cohen, 2014). Given the market competition within industry the findings are unlikely to be published in peer-reviewed journals or made publicly available. Furthermore, the powerful influence of the food industry in driving the health research agenda, and their direct involvement in the research process may significantly influence research outcomes to favour industry's objectives (Bes-Rastrollo et al., 2013; Kearns et al., 2016; Nestle, 2013b; Nestle 2016a; Thacker, 2017). There is a need for trans-disciplinary high-quality research, whereby manufacturers and retailers engage with researchers from the fields of public health and marketing, and it is suggested that these multisectoral approaches may improve the acceptability, feasibility and sustainability of public health intervention (Lang & Rayner, 2007; Schilling et al., 2009; Swinburn et al., 2005). However, researchers remain in 'silos' and trans-disciplinary research continues to be advocated but rarely implemented within obesity-related policy research (Shill et al., 2012; Swinburn 2008; Schilling et al., 2009).

Implications for policy

The Balanced Ladder proposes that interventions defined as nudge or choice architecture approaches may have a negligible impact on autonomy, and that consequently no special justification is required for implementation (Griffiths & West, 2015). Furthermore, policies which modify choice architecture to subconsciously influence behaviour have equal impacts across socioeconomic and weight gradients (Marteau et al., 2011), and therefore have the potential to reduce the inequalities which are suggested to be exacerbated by fiscal interventions or those which rely on individual knowledge and skills (Backholer et al., 2016) In this regard, there is reason for governments to consider the implementation of these strategies due to their potential to reduce health inequalities and enhance individual autonomy, irrespective of limited evidence for effect.

Future research

Since the search for this review was conducted, at least one other relevant research trial has been conducted (Huse et al., 2016). Given this and the identification of relevant trials which implement combined 'nudge' interventions the study protocol has been modified to inform a more comprehensive search (Appendix 4; A4.2), which is likely to yield a greater number of eligible trials.

CHAPTER 5: THE IDENTIFICATION OF LEVELS OF INTRUSIVENESS AND AUTONOMY WITHIN STAKEHOLDER ADVOCACY

5.1 Preamble

In the absence of sufficient evidence on the effectiveness of obesity policy, (Mayne et al., 2015, Sacks et al., 2008) alternative guidance is required to inform ethical decision making and prioritise action. Effective health policy requires the support of a wide range of stakeholders for successful development, implementation and sustainability, and the significant influence of stakeholder opinion on policy adoption was highlighted in Chapter 1. However, the opportunity for individuals to contribute to policy decisions may not be offered equally to all stakeholder perspectives. Recent methods have been employed to bring forward a range of stakeholder perspectives involved in obesity (Stirling et al., 2006, VicHealth, 2016), and have offered valuable findings and alternative forms of evidence where more traditional measures of effectiveness are lacking (Millstone et al., 2007, VicHealth, 2016).

General concern about a 'nanny state' and intruding on individual choice, has been used to avert government regulation and environmental change to address obesity world-wide (Crampton et al., 2011). The focus of criticism about government intervention has been on individual freedom. Evaluating policy options recommended by stakeholders, in terms of the impact on individual autonomy, is worthwhile as it explores the direction of impact to autonomy that may be most and least widely supported. Further, the investigation of current recommendations may determine whether some 'intrusive' interventions (as classified according to the Nuffield Ladder) which are assumed to have 'negative' connotations, may in fact be necessary to increase autonomy (as proposed by the Balanced Ladder); a challenge to the concept that any intervention necessarily comes at a cost to autonomy (Griffiths & West, 2015). The concept of autonomy aligns with constructs traditionally regarded as important in the development, implementation and evaluation of obesity prevention interventions (Hawkes et al., 2013, Swinburn et al., 2005) and may be a useful tool for analysing stakeholder recommendations made to government.

This chapter provides a valuable contribution to supplement research on intervention effectiveness, to provide a deeper understanding into the type of interventions which stakeholders' support. To specifically contribute to the aim of the thesis, and provide a novel

contribution to current research, this chapter investigates existing support for interventions, explored in association with the concepts of intrusiveness and autonomy.

5.2 Aim

The primary aim of this study was to explore the feasibility of classifying stakeholder policy submissions, made directly to government, according to their impact on individual autonomy, and to consider the application of the concept to government-led obesity policy adoption. A secondary aim was to identify the similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy.

This chapter has been divided into two parts accordingly. Part one presents the findings of the first analysis which was conducted to meet the primary study aim. Part one represents a manuscript entitled *'Obesity prevention advocacy in Australia: an analysis of policy impact on autonomy'* which has been published in ANZJPH in March 2017. Part Two presents the findings of the second analysis which sought to address the secondary study aim. The manuscript entitled *'Impacting autonomy with obesity policy: A comparison of the recommendations made between stakeholder groups'* is currently being drafted into a publishable format and will be submitted for peer-review in June 2017. The results of both analyses have been disseminated at international and national conferences (section xxii; appendix 5.1).

5.3 PART ONE: Obesity prevention advocacy in Australia: an analysis of policy impact on autonomy.

Part one was conducted to address the primary study aim: *'to explore the feasibility of classifying stakeholder policy submissions, made directly to government, according to their impact on individual autonomy, and to consider the application of the concept to government-led obesity policy adoption'.*

Citation: **Haynes E**, Hughes R, Reidlinger D. Obesity prevention policy advocacy in Australia: An analysis of policy impact on autonomy. Australia and New Zealand Journal of Public Health. 2017. DOI: 10.1111/1753-6405.12660

5.3.1 Introduction

It is widely accepted that elected governments have a primary responsibility to protect and promote the public health (Nuffield Council 2007, World Executive Board Members, 2015). The adequacy of government health policy is often determined by the politics of policy formulation, policy implementation and resource allocation, significantly influenced by advocacy from often competing and vested interest groups (Cullerton et al., 2016a). The World Health Organisation supports government policy as an instrument for intervention in the interest of obesity prevention (WHO, 2016a). Delivering well-aligned, national, regional and local policy action is imperative to enable supportive environments for targeted intervention (Sacks et al., 2008, WHO, 2016a)

Despite a plethora of national and global policy recommendations addressing obesity prevention, Australia remains without an extant national obesity strategy, and the majority of objectives of the most recent preventative health strategy, which relate to healthy weight, diet and physical activity, remain largely unimplemented (Australain Government, 2009b). At state and local level, policy development and implementation has shown more promise (NSW Ministry of Health, 2013, State Government Victoria, 2015), however, there is inconsistency between states and an absence of a coordinated national policy response to obesity. This is at odds with the well-resourced and highly coordinated lobbying efforts of the food and beverage industry (Nestle, 2013a).

The Australian Government has a track record of success in reducing high-risk health behaviours through national legislation, despite the difficulties associated with legislating in the interest of public health, often in direct conflict with other, largely commercial interests (Brownell & Warner, 2009). Legislation has been successfully applied to promote smoking cessation, reduce drink driving and introduce compulsory seatbelt use (ANPHA, 2013). To date there has been limited enthusiasm by Government to apply similar policy instruments to address obesity, mostly been confined to a low-level, self-regulatory approach that emphasises personal responsibility (Reeve & Jones, 2016, Swinburn & Wood, 2013). This approach aligns with the advocacy position of commercial interests, which lobby for deregulation, unrestricted marketing practices and against government protections for consumers (Brownell & Warner, 2009, Nestle, 2013,).

While prevention efforts have been focused on individual behaviour change for obesity, concerns have arisen about the unintended consequences of such an approach on vulnerable populations, specifically children and low-income communities. The focus on individual responsibility has been proposed as a threat to effective prevention, through unhelpful stigmatisation (Puhl & Heuer, 2010). Further, the adoption of interventions with a narrow definition of health (focused on weight, rather than a more holistic view of health), has been associated with an increase in disordered eating behaviours, and has resulted in further prevention efforts to normalise body image and eating behaviour in young people (O'Dea, 2005). Of great concern is the potential to exacerbate existing inequalities in health across the socioeconomic gradient where interventions may impose a larger burden on those most disadvantaged, for example taxes on unhealthy foods (Thow et al., 2010). Interventions focused on information and knowledge have been demonstrated to be less effective for people from lower socioeconomic positions and more likely to widen health inequalities (Backholer et al., 2014).

A comprehensive systems approach that encompasses all dimensions of the socio-ecological model and individuals' interactions with the systems operating within the environment, is supported by public health advocates to avoid some of these unintended harms (Peeters & Backholer, 2015, Swinburn et al., 2015). In Australia, this requires an inclusive package of local, state and national policy actions. However, a lack of policy leadership by government and the associated lack of accountability to government by stakeholder groups is recognised as a primary barrier to progress in obesity prevention (Swinburn et al., 2015).

The policy-making process by government is not always a linear or rational process, often deviates from expert health opinion and to varying degrees is influenced by advocacy (Cullerton et al., 2016a). In a political environment with conflicting interests, policy makers can be constrained by a lack of evidence; a recognised barrier to government policy development and implementation (Brownson et al., 2009, Cullerton et al., 2016a, Lang & Rayner, 2007). In the context of obesity, the evidential 'gaps' have been attributed to the complexity of implementing population-wide pragmatic interventions without justifiable evidence, or a result of poor translation and dissemination from science to politics (Kite et al., 2015, Tricco et al., 2016, Yoong et al., 2014). There is insufficient evidence on the effectiveness of obesity policy itself (Mayne et al., 2015, Sacks et al., 2008), and it has been claimed that published evidence on the effect of obesity interventions generally has little relevance to policy makers (Kite et al., 2015). Therefore, regardless of the significance of research findings, policy change may not be established, particularly where political and public will is lacking (Cullerton et al., 2016[a], Fielding & Briss, 2006).

Despite these complexities, government-led policy is necessary (Swinburn et al., 2015). Where the best 'possible' evidence is not obtainable, stakeholder opinion may be valued as the best 'available' (Muir Grey, 1997). One mechanism used by Australian governments to achieve best available evidence is to formalise a government inquiry, such as the last Australian Government Inquiry on Obesity in 2008 (Parliament, 2008). The aim of such an inquiry is to explore stakeholder perspectives to inform policy decisions, however, the significance of this in practice is under-explored.

Given the complexity and uncertainty relating to policy interventions to address obesity, conceptual frameworks that help to interpret the function, effect and implementation of policy are important. A number of tools have been proposed and applied to interpret obesity policy options. One such Obesity Policy Framework (Sacks et al., 2008) categorises policies as downstream or upstream; downstream being those that 'improve the ability for individuals to make appropriate healthy choices' and 'upstream' measures being those that 'increase the opportunities to make healthier choices or restrict the counteracting influences on healthy choice making' (Sacks et al., 2008).

The Nuffield Council on Bioethics describe a similar concept, and categorise policy intervention by the level of intrusiveness to individual choice (Nuffield Council, 2007). They suggest public health policy can be categorised across an escalating 'Ladder' of eight levels of intrusiveness, from doing nothing to restricting or eliminating choice, and several of these levels are reflected in food policy frameworks (Hawkes et al., 2015, Hawkes et al., 2013, Swinburn et al., 2013). The Nuffield Council suggest that high-level, restrictive, upstream policies require greater evidence to justify and may be less publicly and politically acceptable than lower level options (Diepeveen et al., 2013). Recent research suggests that these 'types' of high-level intrusive policy may have a greater impact on obesity-related outcomes than lower level informative strategies (Mayne et al., 2015).

A recent modification to the Nuffield Ladder proposes that restrictive policies diminish individual autonomy, which in turn influences the degree of ethical concern around implementation (Griffiths & West, 2015). The Griffiths and West's framework (known as the Balanced Ladder of Intervention) assigns positive and negative numerical values to the Nuffield Ladder rungs to describe the influence to autonomy of interventions focused at different levels, which can be further collapsed to a simple 5-point autonomy scale (Table 5.1).

Table 5.1: Description of the different categorisation levels of the Nuffield Ladder and Balanced Ladder of intervention, with examples

Nuffield Ladder level[1] (Intrusiveness)	**Balanced ladder level[2] (Impact on Autonomy)**	**Pooled level of impact on autonomy (5-Level)**	**Pooled level of impact on autonomy (3-Level)**	**Example description[1]**
Eliminate	-4	-2 Diminish	*Autonomy-negative* *(reduces autonomy to varying extent)*	*Eliminate choice* - Regulate in such a way as to entirely eliminate choice, for example through compulsory isolation of patients with infectious diseases.
Restrict	-3			*Restrict choice* - Regulate in such a way as to restrict the options available to people with the aim of protecting them, for example removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants.
Disincentives	-2	-1 Reduce		*Guide choice through disincentive* - Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example through taxes on cigarettes, or by

				discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.
Incentives	-1			*Guide choice through incentive* - Regulations can be offered that guide choices by fiscal and other incentives, for example offering tax-breaks for the purchase of bicycles that are used as a means of travelling to work.
Do nothing	0	0 Neutral	*Autonomy-neutral* *(no or very little impact on autonomy)*	*Do nothing or simply monitor the situation*
Change the default	0			*Guide choice through changing the default policy*- For example, in a restaurant, instead of providing chips as a standard side dish (with healthier options available) menus could be changed to provide a more healthy option as standard (with chips as an option available).
Inform	+1	+1 Increase	*Autonomy-positive* *(increases autonomy to varying extent)*	*Provide information* – inform and educate the public, for example as part of campaigns which inform people of the health benefits of specific behaviours.
	+2			*Educate for autonomy* – For example through a media studies curriculum which shows children how to recognise the techniques used to manipulate choice through marketing or by banning marketing primary targeted at children.
	+3	+2 Enhance		*Ensure choice is available* – For instance, by requiring that menus contain items that someone seeking to maintain healthy would be likely to choose.
Enable	+4			*Enable choice* - Enable individuals to change their behaviours, for example by offering participation in a NHS 'stop smoking' programme, building cycle lanes, or providing free fruit in schools.
	+5			*Collective self-binding* – for example, a decision by a community, after debate and democratic decision making, to ban the local sale of alcohol.

The general concern about developing a 'nanny state' and intruding on individual choice, has been used to avert government regulation and environmental change to address obesity world-wide (Crampton et al., 2011). Given that the focus of criticism about government intervention has been on individual freedom, policy options in terms of the impact on individual autonomy is worthwhile as it allows the exploration of whether some 'intrusive' interventions (according to the Nuffield Ladder) may in fact be necessary to increase

autonomy (according to the Balanced Ladder) and challenges the concept that any intervention necessarily comes at a cost to autonomy (Griffiths & West, 2015).

In the absence of sufficient evidence on the effectiveness of obesity policy (Sacks et al., 2008, Mayne et al, 2015) guidance is required to inform ethical decision making, prioritise action and support implementation monitoring programs (Swinburn at el., 2013). The concept of autonomy aligns with constructs traditionally regarded as important in the development, implementation and evaluation of obesity prevention interventions (Millstone et al., 2007, Hawkes et al., 2013, Swinburn et al., 2005, NPHP, 2001) and may provide a valuable framework for classifying obesity policy options.

Aim

This study's aim was to explore the feasibility of classifying stakeholder policy submissions according to their impact on individual autonomy and to consider the application of the different levels of autonomy on government-led obesity policy development, implementation and evaluation.

5.3.2 Method

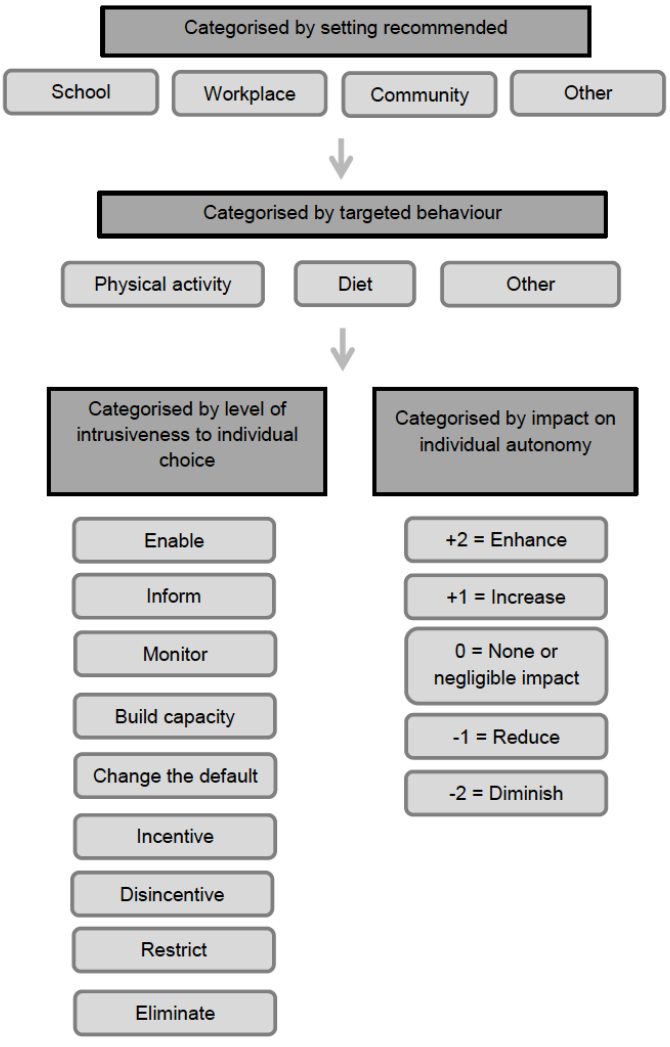
This study involved a review and document analysis of 158 publicly accessible submissions to the Australian Government Inquiry into Obesity (2008). This Inquiry was identified as the most recent, relevant, comprehensive and concise database of stakeholder advocacy related to obesity in Australia in the last decade. All submissions made to the Inquiry were obtained in text format. Where reference was made to supporting information, documents were obtained and analysed in accordance with the relevant submission.

Directed content analysis was performed independently (EH) via repeated readings and extraction of explicit recommendations from each submission. Quotes and summaries were extracted for analytical triangulation by the research team. Only recommendations concerning primary and/or secondary prevention measures were included for analysis; those related to clinical treatment, including surgery or pharmaceutical interventions, were excluded.

Data analysis

A mixed-method analytical approach was employed in line with existing approaches to public health research (Brown & Gould 2011; Gicevic et al. 2016; Ritchie & Spencer, 1994; Richards et al. 2015). Content analysis was used, given its relevance to deductive methodology (Hsieh & Shannon 2005), to isolate and then categorise recommendations through the frameworks of the Nuffield Ladder (Nuffield Council, 2007) and the Balanced Ladder (Griffiths & West 2015). Categories were collapsed from these frameworks to develop levels for the coding framework (Table 5.1, Fig 5.1) and where sufficiently detailed, data was coded by setting and target behaviour; those too ambiguous were coded as 'other' (Fig 5.1).

Fig 5.1: Content analysis framework



Researcher triangulation was applied to enhance the quality and credibility of the categorical analysis. Discrepancies in categorisation between researchers were resolved through discussion and agreement.

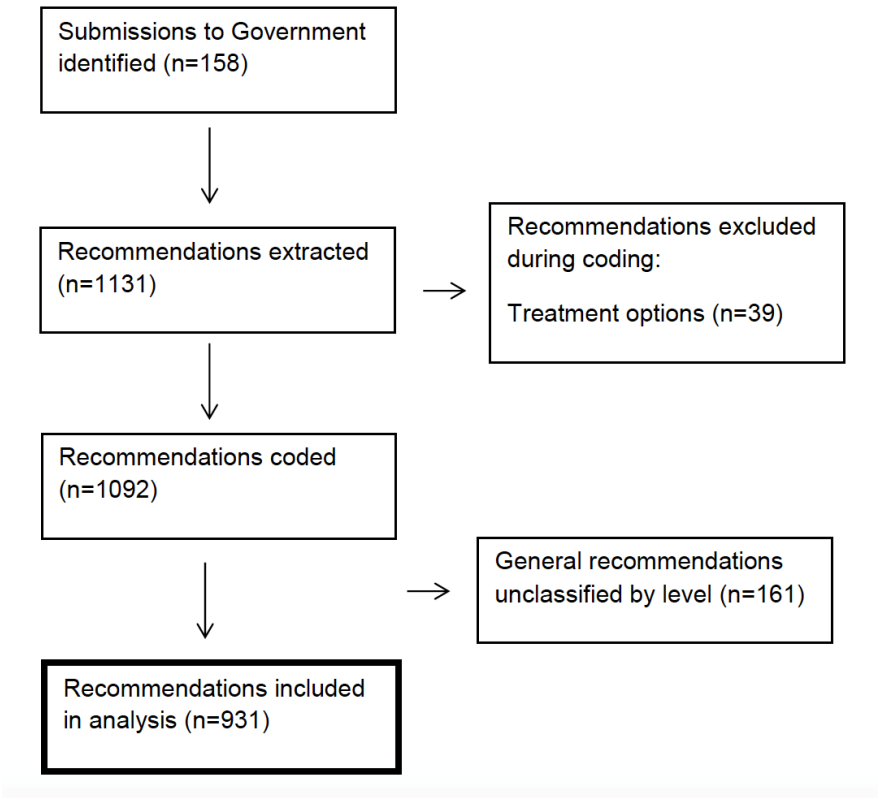
Data that did not align with pre-defined codes was identified and later analysed further, in accordance with a directed approach to content analysis (Hsieh & Shannon 2005). Where similarity was interpreted between these recommendations, an additional ladder level was developed. These recommendations encompassed a mutual category of building capacity for effective implementation; they were deemed to have a negligible impact on individual's autonomy and impart little intrusion to individual choice. The additional 'rung' was subsequently defined as 'building capacity', assigned as neutral (0) for both the Ladders, and options were coded accordingly.

Finally, given the value of applying descriptive quantitative analysis to summarise the data (Goulden et al. 2011), data was summarised using frequencies and the proportions for each level of autonomy were calculated. Chi-square test for independence was employed as a non-parametric statistical test to explore significance ($p<0.05$) between levels recommended using SPSS Statistics for Windows (Ver 23.0. IBM, New York).

5.3.3 Results

A total of 1,131 discrete recommendations were extracted from 158 advocacy submissions (mean of seven recommendations per submission). Thirty-nine (<4% of total) were excluded as obesity treatment recommendations (Fig 5.2) and 1,092 were extracted and analysed through the content analysis framework (Fig 5.1). Of this total, 931 (85%) could be categorised by their level of intrusiveness and influence to autonomy (Table 5.1; Appendix 5.5).

Figure 5.2: Overview of data extraction during document analysis



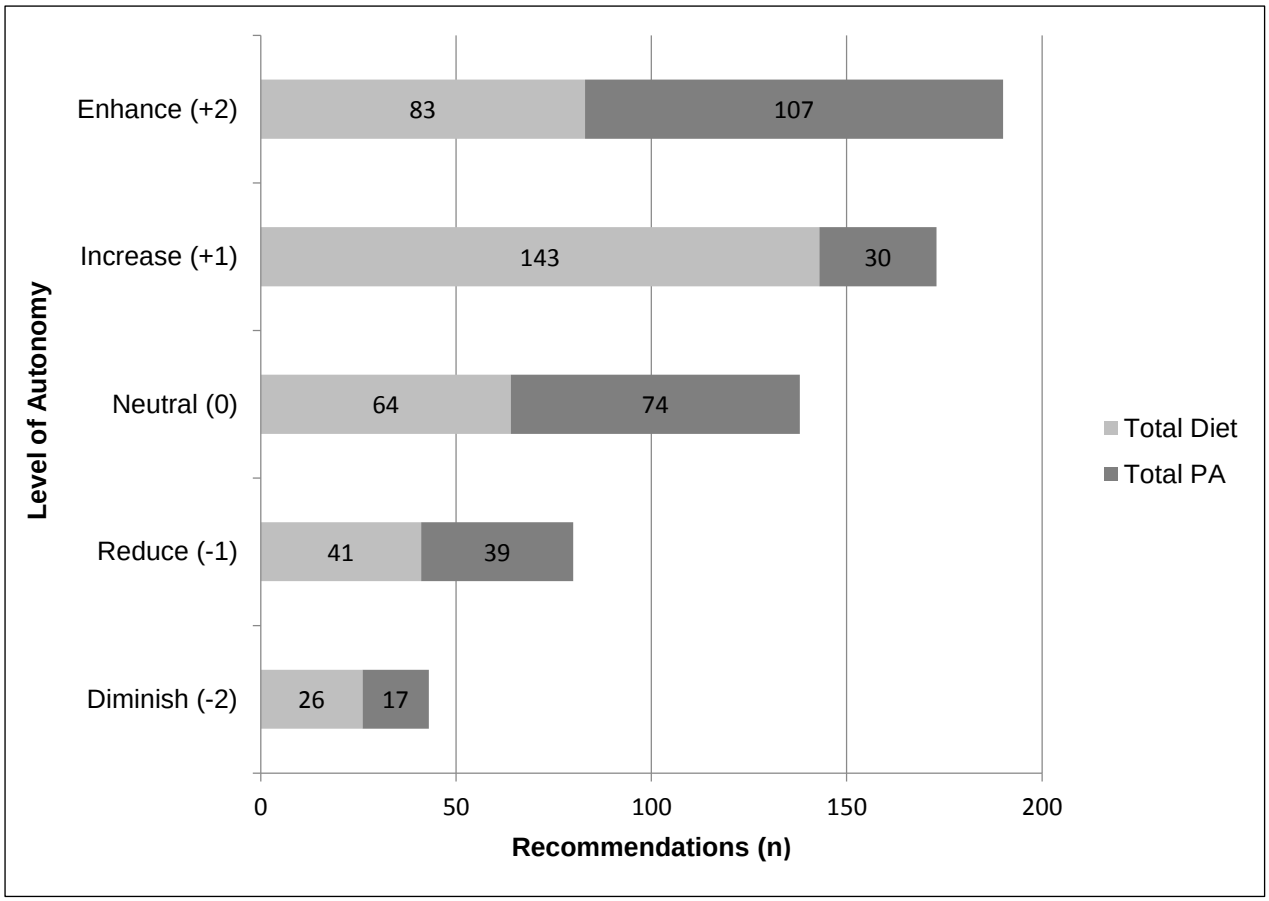
A number of recommendations offered general guiding principles or a recommended approach to policy making rather than discrete recommendations and therefore were too ambiguous to classify through the framework (15%, n=165; coded as 'unclassified'). With regard to setting, 10% (n=89) were recommended for schools, 4% (n=36) for workplace and 81% (n=751) for community implementation; 6% (n=55) could not be classified by setting.

Of those that could be classified by behaviour (n= 624) ,significantly greater number of recommendations were made for dietary intervention (57%; n=357) than physical activity (n=267; 43%; $p<0.05$). However, for workplace interventions (Figure 5.3), recommendations to target physical activity (78%) were made more frequently than those associated with dietary behaviours (22%; $p<0.05$).

There was a significant association between the impact to autonomy and the frequency of recommendation ($p<0.001$). Recommendations that increase autonomy (46%; n=426) were

more frequently recommended than those that reduce autonomy (14%; n=146), or those that have a negligible influence (38%; n=355; p<0.005) (Figure 5.3).

Fig 5.3: Distribution of recommendations according to target behaviour and level of autonomy (n).



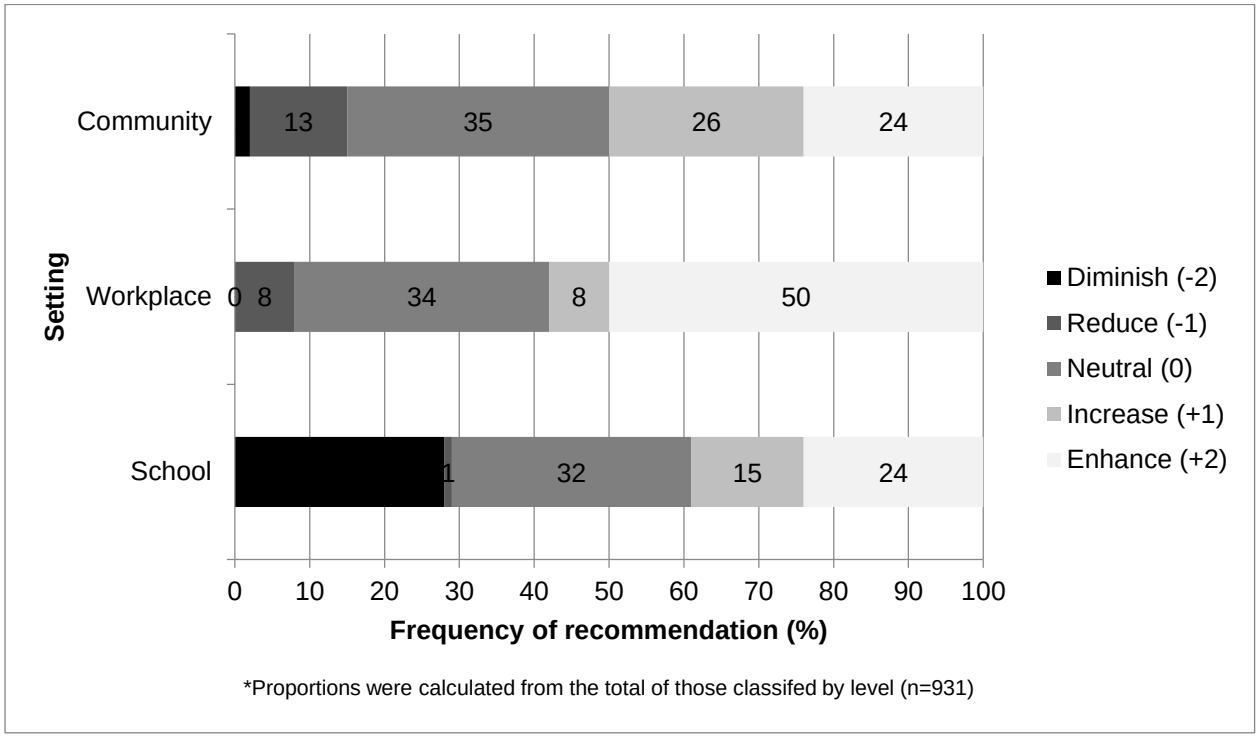
Setting and autonomy

There was a significant association between the impact to autonomy and setting (p<0.001; Figure 2). Recommendations that reduce autonomy were the least frequently recommended in every setting; but were more frequently recommended in schools (28%; n=26) than in the work place (8%; n=3) or community (15%; n=117) (p<0.005) (Figure 2). Only 3% (n=43) of the total recommendations diminished autonomy to the greatest extent by restricting choice and of these 78% (n=25) were recommended for implementation in schools. Restricting choice was the second most frequently recommended level of intrusiveness for school

interventions (28% of school recommendations, n=25), but was infrequently suggested for the workplace (0) or community (1%; n=18).

Options that increase autonomy in the community setting, accounted for 40% of total recommendations (n=372). Promoting autonomy to the greatest extent by enabling choice, accounted for over a quarter of recommendations within each setting; including school (24%; n=21), community (24%; n=173) and workplace suggestions (50%; n=18) (Figure 5.4). Options that had a negligible influence on autonomy were frequently recommended (38%; n=355). Those that 'build capacity' were most frequently recommended (29%; n=268), however the value of monitoring and surveillance was widely recognised (8%; n=77), particularly for community-wide implementation (81% of all monitoring recommendations). Among the options that reduce autonomy, providing incentives (9%; n=85) was more frequently recommended than providing disincentive (2%; n=18) or restricting choice (5%, n=43). Incentives were more frequently suggested for community (n=81) and work place (n=3) than in the school setting (n=1; $p<0.005$) and for physical activity (n=37) more than diet (n=26). Disincentives were not recommended by any submission for the school or workplace, and infrequently among community suggestions (2%; n=18). The majority of suggested disincentives were to influence dietary choice (83%; $p=<0.005$), such as taxing unhealthy foods.

Fig 5.4. Proportion* of recommendations within settings



Target behaviour and autonomy

There was a significant association between impact to autonomy and target behaviour ($p<0.001$). Enhancing autonomy to the greatest extent, by enabling choice, was frequently recommended for physical activity-related options (40%), while increasing autonomy to a lesser extent by informing choice was most highly suggested for dietary options (40%). Among all recommendations to inform choice, 68% were diet-related and14% activity-related. Among all recommendations to enable choice, 51% were activity-related and 38% diet-related. However, recommendations to diminish autonomy to the greatest extent were more common for diet (61%) than activity behaviours (39%; $p<0.001$).

Those recommendations that could not be classified by the frameworks of intrusiveness or autonomy were categorised as 'guiding principles/general approaches for policy making', and frequently emphasised the importance of collaborative working, a multi-sector comprehensive approach, and identification of priority target groups. A small number (n=7) of 'negative' recommendations were identified, whereby the submitter actively recommended

against a stated intervention. Of these, the majority (n=6) opposed diet-related disincentives, incentives and marketing restrictions.

5.3.4 Discussion

This study set out to explore the feasibility of classifying and assessing stakeholder policy advocacy according to impact on autonomy (Griffiths & West 2015). The results demonstrate that impact on autonomy is a relevant concept to the framing and analysis of government-led intervention for addressing obesity. Further, the specific application of the Nuffield Ladder of Intervention (Nuffiled Council 2007) and the Balanced Ladder of Intervention (Griffiths & West 2015) to obesity policy options proposed by stakeholders demonstrates the relevance of the frameworks to real-world obesity policy advocacy.

A key finding was the significant association between the impact to autonomy, and stakeholder support. Interventions that increase individual autonomy were more frequently recommended, than those that reduce or have a negligible influence on autonomy. This direction of preference reflects resistance to the notion of developing a 'nanny state', which to date, has increased resistance toward government-led regulation (Magnusson 2015). Previous research supports that enabling or informing choice (approaches which enhance autonomy), may be more acceptable forms of public health intervention (Diepeveen et al. 2013), and their value has been recognised globally within research and public health directives (Organisation 1986, Hawkes et al. 2013, Hawkes et al. 2015, Organisation 2016a). These strategies that balance choice architecture have been proposed for implementation at state level in Australia, (ACT Health 2013; NSW Government 2013) and are recognised as important by stakeholders internationally, (Millstone & Lobstein 2007) despite a lack of evidence from national-level trials to support their effectiveness (Mayne et al. 2015). The findings of this analysis supports the preference for interventions which enhance individual autonomy, among stakeholders in Australia.

In terms of the different strategies that increase autonomy, informing choice is recognised as integral to addressing obesity and the most prolifically implemented level to date.(Fransen et al. 2012, Sobol-Goldberg et al. 2013). Educational interventions, however, have been insufficient as a stand-alone strategy with their effectiveness dependent on access, availability and opportunity for healthy choice. By contrast, far less attention has been paid to

enhancing autonomy to a greater extent, through modifying environments to enable healthy preference learning or convenience of healthy choice, (Hawkes et al. 2015) despite their potential feasibility, cost effectiveness and role in dismantling the impact of socioeconomic inequality on healthy choice (Dalton, 2013; Mayne et al., 2015; Millstone, 2007; Sacks et al, 2011, Vos & Carter, 2010). A large proportion of those that have been implemented have remained voluntary and self-regulated, which serves to undermine the effectiveness of such strategies (King et al. 2011; Sharma et al. 2010; Vandevijvere et al.,2015) Policies that target commercial organisations and public services with a voluntary approach may incite less resistance; as a lack of legislative obligation around the extent of implementation may be considered less intrusive. However, the subsequent impact that the policy has on individual's autonomy, once implemented, is indifferent; highlighting how policy can be variably intrusive to stakeholder groups.

Regulation or restriction

The current framing of regulation in public health policy may understate its positive influence on individual autonomy. Therefore the definitions of regulation and restriction, in the context of obesity prevention policy, may require greater transparency. The Balanced Ladder provides an illustration of how regulation, restriction and autonomy interrelate, which can be readily applied to public health policy, as confirmed in this study. The analysis highlighted a number of policy examples that were identified as restrictive to industry and services; regulation around advertising and marketing including food labelling, restrictions to the type and frequency of unhealthy food outlets within suburbs, healthy food procurement and regulation around portion size; however, when classified through the Balanced Ladder framework these examples increase individual autonomy (Griffiths & West 2015). Where regulation to restrict commercial organisations from promoting unhealthy choice reduces industry autonomy; the same may enhance individual's autonomy to make fair choice.

Viewing regulatory public health policy through an individual autonomy lens contrasts with the underlying principles of popular frameworks, such as Nuffield's Ladder, which classifies 'doing nothing' as promoting freedom to the greatest extent. This position ignores the impact of regulatory policies on rebalancing the 'obesogenic' environment, which enhances individual autonomy. The current rhetoric merges the terms regulation and restriction, which may result in consumer misunderstanding around the intrusiveness of regulatory policy. Such

misconceptions may be promoted indirectly through resistance and lobbying from industry, to reduce public will when regulation around unhealthy food has been proposed (Mialon et al. 2017), and could well account for the lack of implementation of regulative or legislative tools in Australia and elsewhere (Cullerton et al. 2016b; Swinburn & Wood 2013).

Tailoring through autonomy

The association between impact to autonomy and support from stakeholders was influenced by setting and target behaviour. In this analysis, the school setting was subject to a significantly greater proportion of restrictive recommendations than any other setting, which suggests greater acceptability of restriction when targeting children. The acceptability of restrictive interventions for public health is suggested to be inversely associated with age and is further influenced by whether the individual themselves will be directly affected by policy (Diepeveen et al. 2013). Furthermore, the majority of trials exploring restrictive strategies have been conducted in schools setting, (Mayne et al. 2015) supporting the utility of tailoring the options proposed, in terms of their impact to autonomy, according to setting.

The recommendations that relate to diet had lesser impact on autonomy than the physical activity-related option. This finding points to the importance of health policy leadership that recognises the conflicting interests of stakeholders. Policies to promote physical activity generally do not have to contend with large commercial interests, while dietary interventions that promote individual autonomy to the highest degree are likely to simultaneously diminish the autonomy of 'Big Food' companies. Powerful lobbying against food provision regulations (Mialon et al., 2017; Nestle, 2013) may account for some of the variance in support shown in this analysis between diet and physical activity options, and further suggests that clarifying the positive influence to consumers of food regulation should be a priority.

5.3.5 Strengths and limitations

This research provides a pragmatic, applied insight into real-world advocacy for government-led policy to address obesity in the Australian context. The analysis of submissions made to the inquiry provided a nationally relevant sample representing the diversity of stakeholders to obesity in a readily available format for analysis.

In identifying limitations, the authors acknowledge the date of the Inquiry, which was the most recent federal inquiry in Australia; however, scarce implementation of fundamental components of the Australian preventative health strategy developed in response to this Inquiry, supports the ongoing relevance of understanding barriers to implementation to advance progress toward national health targets (Moodie et al., 2016). Furthermore, a comparison to recommendations made in recent national and global advocacy (VicHealth, 2016; WHO, 2016a) illustrates clear alignment with current stakeholder advocacy.

The analysis explores the impact on autonomy, setting and behaviour as variables to obesity prevention interventions. While the association between these variables and stakeholder support is remarkable, the independent influence of autonomy on support should be interpreted with caution. A number of policy characteristics are acknowledged as contributors to acceptability (Diepeveen et al., 2013), and therefore the concept should be valued as an addition to the larger portfolio of drivers to acceptability public health policy. The sample used in the analysis was confined to stakeholders who were motivated to submit to the government Inquiry. The use of a sample from alternative methods that engage consumers, such as public opinion surveys (Barry et al., 2013), may have resulted in wider representation of stakeholders including individuals less likely to contribute to a formal government inquiry, such as children. However, the submissions provided an engaged, information-rich sample, which aligns with the primary objective of this research: to explore recommendations made directly to the Australian Government Inquiry.

Analysis of stakeholder policy advocacy does not provide intelligence about the most effective or efficient policy responses to address obesity. It does provide insights about political acceptability and the various vested interests that influence policy responses. Both the framework and theory applied in this study are subject to interpretation of the concepts described, and therefore further investigation into stakeholder perceptions of the concept of autonomy and intrusion to choice is required.

5.3.6 Conclusion and implication

Seven years on, the majority of the recommendations made to the Government Inquiry into Obesity have not been implemented, despite aligned recommendations in recent state-level

priority-setting efforts. The findings of this study validate the utility of the impact on autonomy, as proposed by the Balanced Ladder framework, for assessing obesity-related policy options. Viewing the options through an autonomy lens may predict stakeholder resistance, and the interplay of setting and target behaviour in the association between autonomy and acceptability gives rise to further opportunity to explore policy options tailored to these variables. Re-framing regulation according to individual and industry autonomy may be a valuable driver for systems change (Swinburn et al., 2015). Further research around stakeholders' interpretation of these concepts is required to gain greater insight into the role of autonomy as a barrier to implementation, and as a key point of difference between stakeholder group perspectives.

5.4 PART 2: Impacting autonomy with obesity policy: A comparison of the recommendations made between stakeholder groups.

5.4.1 Preamble

The analyses from Part One provided evidence of the feasibility of classifying stakeholder policy submissions according to their impact on individual autonomy, and presented findings which indicated general stakeholder support for autonomy-positive strategies.

Part Two of this research was conducted to address the secondary study aim: *'to identify the similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy'.*

5.4.2 Method

The methodology has been previously described (Haynes et al 2017; Part One above in section 5.3.2; Appendix 5: A5.2). In summary, the Australian Government Inquiry into Obesity (2008) provided 158 publically available submissions which were purposively obtained in text format. A directed content analysis was conducted, whereby explicit recommendations, quotes and summaries from each submission were extracted, and triangulated by the research team. A total of 1092 discrete recommendations were extracted and charted. Each recommendation was labelled with the submission number which enabled identification of the source and facilitated the coding of each recommendation into stakeholder group to meet the aim of the second analysis. Each recommendation was classified by the 5-level and the 3-level frameworks (Table 5.1). Further details regarding analysis is presented in Part 1 above (5.3.2), and the content analysis framework (Fig 5.1).

For the current study, additional analysis was undertaken whereby each recommendation was further coded according to the stakeholder group that the person making the recommendation was categorised. The categories for stakeholder groups were adapted from the PorGrow project; a multi-national research project which similarly explored diversity between stakeholder groups around priorities for obesity prevention policy (Stirling et al., 2006). The nine stakeholder groups from the PorGrow project were collapsed into five core perspectives

(Table 5.2), to explore similarities and differences between consumers, academics, public health representatives, industry, and government submissions.
In accordance with Part One, given the value of applying descriptive quantitative analysis (Goulden et al. 2011), data was summarised using frequencies and the proportions for each level of autonomy were calculated. Chi-square test for independence was used to explore significance ($p<0.05$) between levels recommended using SPSS Statistics for Windows (Ver 23.0. IBM, New York).

5.4.3 Results

Submissions were received across each of the five stakeholder groups; the number of submissions and policy recommendations made by each group is presented in Table 5.2.

Table 5.2: Submission frequency by stakeholder category

Stakeholder group*	**Proportion of all recommendations**	
	Submissions n(%)	**Discrete policy recommendations n(%)**
Public Health	67 (42)	501 (54)
Academics	35(22)	173(19)
Industry	28(18)	83(9)
Consumers	20(13)	60(6)
Government	8(5)	114(12.2)
Total (n)	**158**	**931**
**Public Health (Specialists, practitioners, health NGO's, public providers); Academics; Industry (Non-food/fitness, food, exercise/fitness); Consumers; Government.*		

Options for community implementation were more frequently recommended than school or workplace by all five groups. A number of recommendations were too general to classify by target behaviour (n=307;33%). When those which could be classified were sub-analysed, the majority of the groups recommended diet-related options more frequently than physical activity-related options; public health (n=200;57%), consumers (n=38;76%), academics (n=58;56%) and government (n=35;51%). Industry recommended those related to physical activity slightly more frequently (n=27;51%).

Four of the five stakeholder groups recommended autonomy-enhancing options more frequently than those classified as autonomy-neutral or autonomy-reducing (Fig 5.5) academics were more likely to make autonomy-neutral recommendations (n=76;44% of academics' recommendations) but to a similar extent as autonomy-positive recommendations (n=66; 38%) (Fig 5.5). Autonomy-reducing options were the least frequently proposed by all groups apart from consumers who were more likely to recommend autonomy-reducing than autonomy-neutral suggestions (n=23;38%) (Fig. 5.5). When classified by the five-level framework, consumers were the only group to recommend options which would slightly reduce autonomy (25%), more frequently than any other level (Fig 5.6).

Figure 5.5: The proportion of recommendations for each level of impact to autonomy according to stakeholder group and the three-level framework for autonomy.

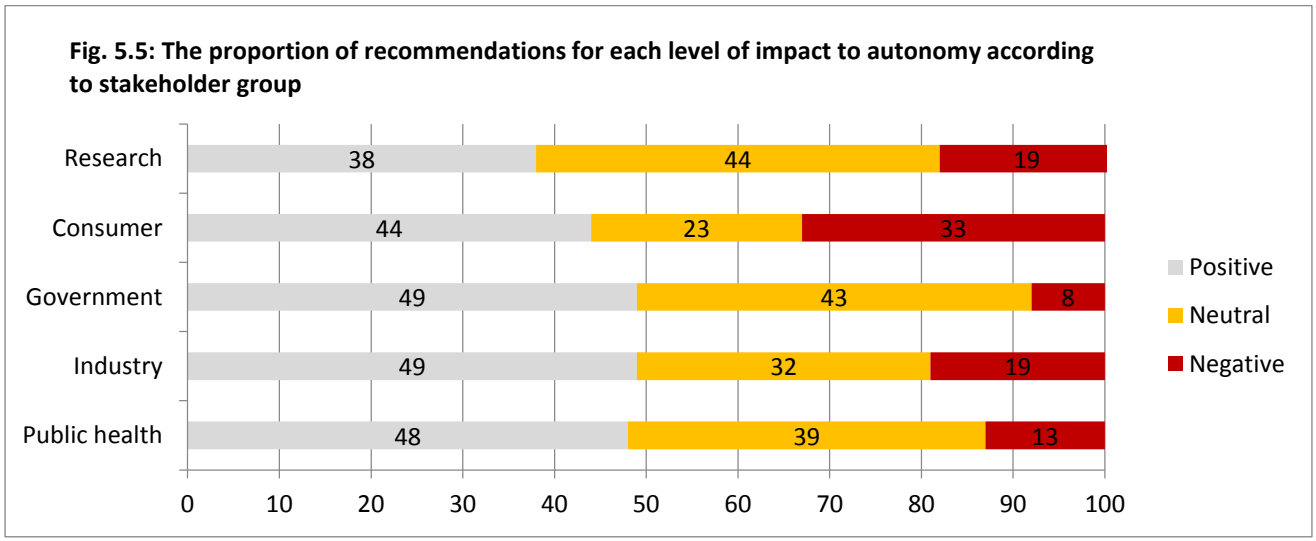
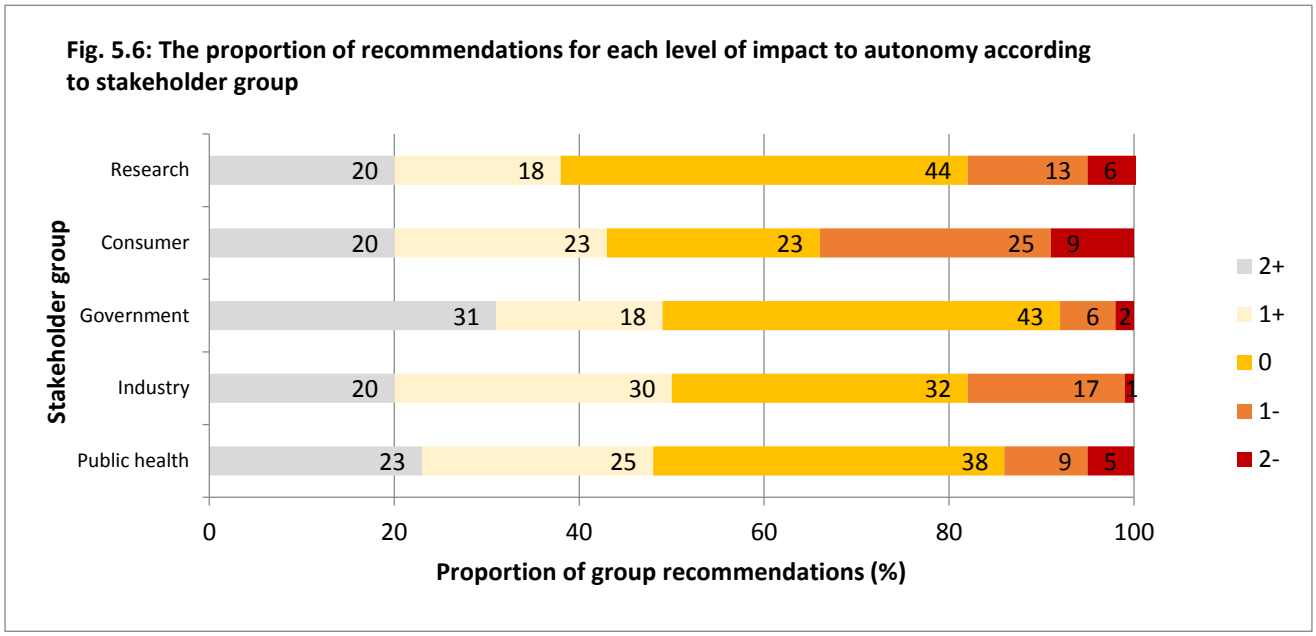


Figure 5.6: The proportion of recommendations for each level of impact to autonomy according to stakeholder group and the five-level framework for autonomy.



School-based options were recommended by all five groups. Across the groups, Public health and Consumers frequently recommended options which would greatly reduce autonomy and Industry more frequently recommended options which greatly enhance autonomy (Fig 5.7). Consumers and Academics provided very few recommendations for workplace options, and amongst Public Health, Industry and Government, options which would greatly enhance autonomy were most frequently recommended (Fig 5.7; A5.6).

When analysed by the five-level framework, the majority of community-based actions that were recommended by industry would slightly increase autonomy (n=24;35%). Government (n=34,41%) public health (n=134;34%) and academics (n=49,36%) recommended autonomy-neutral options most frequently and consumers most frequently recommended autonomy-negative options (n=17,27%), (Fig 5.7). When community-based options were classified by the three-level framework, autonomy-positive options were the most likely to be recommended by all five stakeholder groups (Fig 5.7). Consumers were the only, group to recommend options which would reduce autonomy more often than those classified as autonomy-neutral (n=21;33%: n=14;23%).

Figure 5.7: The proportion of recommendations classified by setting and individual stakeholder group.

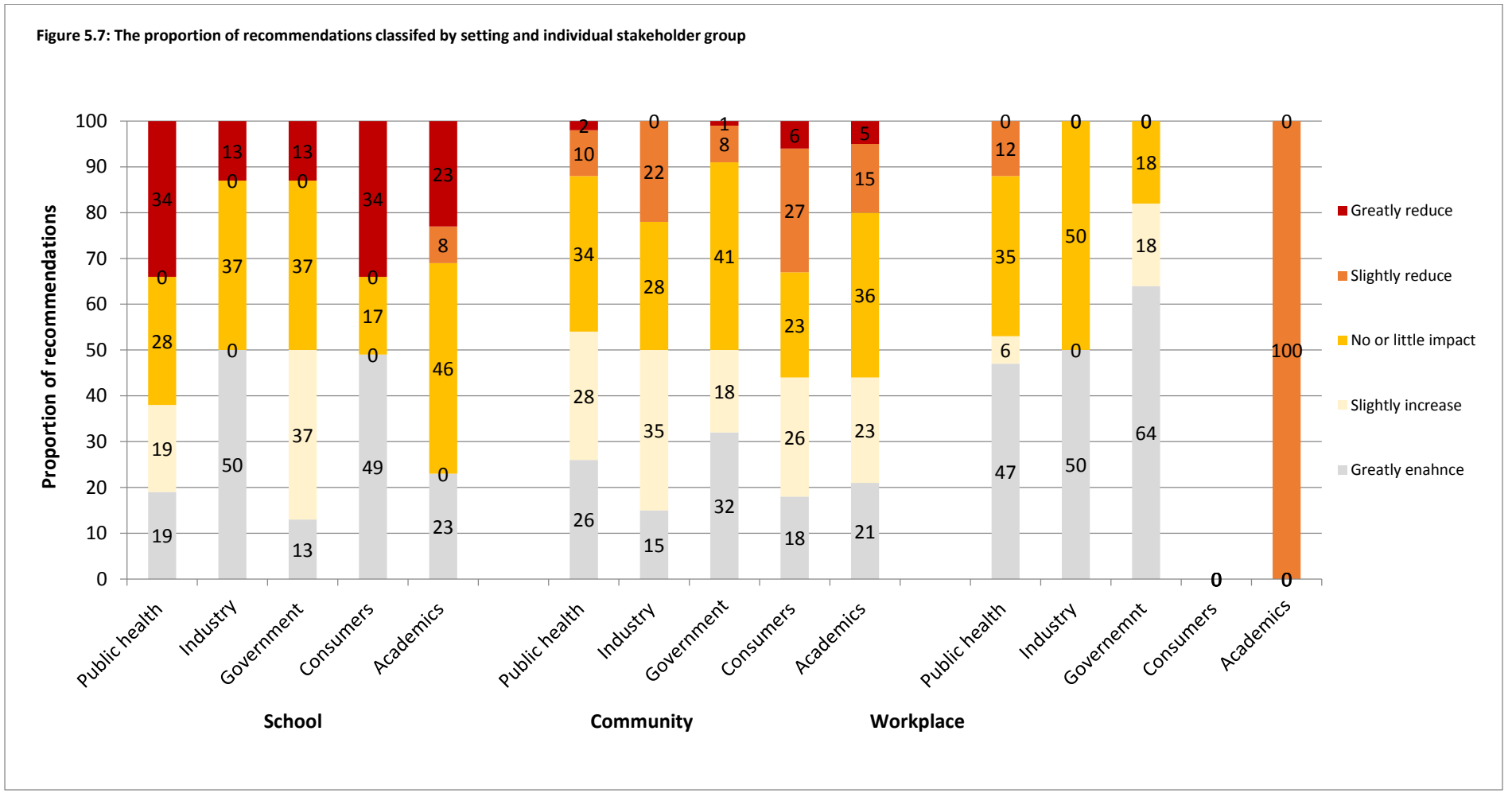


Fig 5.8: The proportion of recommendations classified by target behaviour and individual stakeholder group

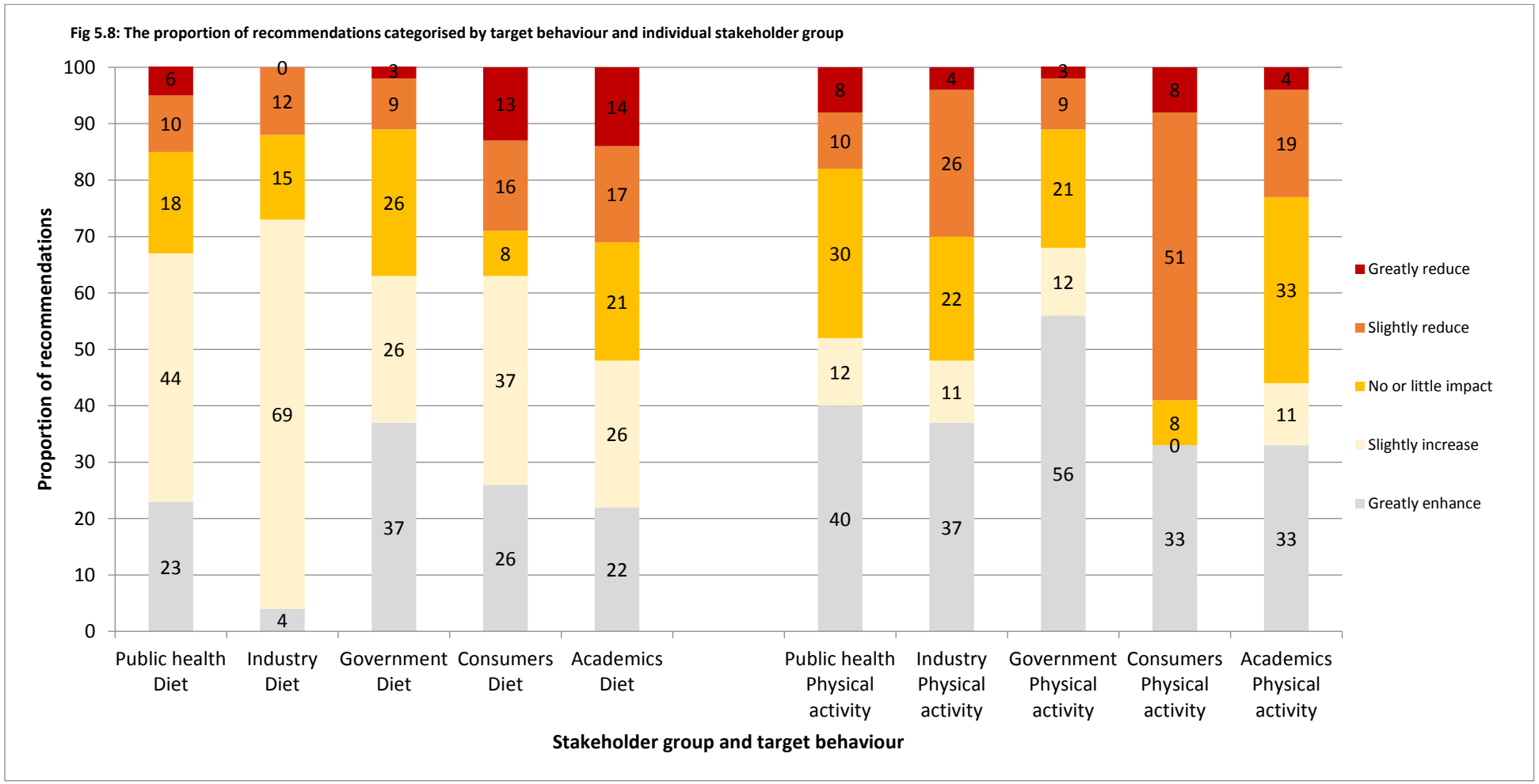


Fig 5.8 presents the findings of the sub-analysis of options by target behaviour. The statistical analysis of diet-related options suggests that the recommended extent of enhancing individual autonomy may be significantly associated with the stakeholder group of the submitter ($p < 0.05$) (A5.4;A5.7). With regard to diet-related actions, consumers were the group who most frequently recommended those which would greatly reduce autonomy (n=5;13%); industry least frequently recommended these (n=0;0%), and therefore the restrictive options presented by industry were classified as activity related options (n=1;4%). Industry least frequently recommended options which would greatly enhance autonomy (n=1;4%) and favoured those which would slightly increase autonomy toward food choice (n=18;69%). Again, in the context of food related options, government infrequently recommended options which would greatly reduce autonomy (n=1;3%), and frequently recommended options which greatly enhance autonomy (n=13;37%). The majority of consumer recommendations for activity-related options were classified to reduce autonomy (n=6;50%).

5.4.4 Discussion

The aim of part two was to identify the similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy.
The results present three key findings. Firstly, there were similarities in the distribution of food-related recommendations classified across the five-levels, by four stakeholder groups, except for industry. Secondly, in the context of food policy, industry variably made recommendations to enhance or reduce autonomy to the greatest extent, and most frequently recommended options with lesser impact to autonomy. Finally, consumers most frequently recommended restrictive options which would reduce autonomy to the greatest extent.

The general similarity between the majority of groups in recommending options which enhance individual autonomy is important to policy progress. The preference for autonomy-positive approaches to obesity-prevention may be attributed to shifting views on the current environment, and has been indicated by exisiting research involving Australian consumers at state-level (Citizens Jury in Victoria) and multiple stakeholder groups internationally (the PorGrow Study in Europe) (Millstone & Lobstein 2007, VicHealth 2016) (Appendix 5.8). Certain policy actions which aim to regulate the environment to establish population-wide change, may have previously been framed as intrusive to personal freedom. These include

zoning laws and regulations to the provision and promotion of unhealthy food and drink. The findings suggest that stakeholders may acknowledge the positive impact that these interventions have on individual autonomy, as a result of balancing choice architecture. Furthermore, where these priorities are not reflected to the same extent amongst industry recommendations, in the context of food policy, it emphasises that the conflict around these forms of policy action, may be attributed to the involvement of vested interests.

The infrequency of industry recommendations to greatly impact autonomy, particularly around food choice, aligns with the general advocacy position of commercial interests. Their preference toward self-regulation and a personal responsibility approach to obesity prevention is widely acknowledged (Jochelson, 2006; Mialon et al., 2017; Nestle, 2013a; Nestle, 2016b; Swinburn, 2008). Interestingly, a similarly low proportion of government recommendations would reduce autonomy around food choice, which may indicate a lack of political support for such approaches. The influence of commercial interests on government decisions may contribute to lack of political will (Cullerton et al., 2016a; Clarke, et al.,2016; Mialon et al.,2017), however, government also variably suggested autonomy-negative options related to physical activity. In this regard, the government recommendations presented may be better explained by awareness of ethical frameworks and the risk of harm and social inequality associated with reducing autonomy, which may incite public resistance and threatens their position for election.

The finding that consumer opinion may significantly vary from other stakeholder views is notable, particularly in the context of a growing movement toward public involvement in health research. The findings suggest that consumers may support approaches which reduce autonomy, where it is clear that the impact of such policies would be to improve public health outcomes. This is remarkable in view of previous suggestions around the poor public acceptability of intrusive public health interventions (Diepeveen et al., 2013). The contrast between the consumer and four other stakeholder groups emphasise the importance of including consumer perspectives in policy advocacy, to ensure policy decisions incorporate the potentially divergent position of underrepresented stakeholders.

To date public and patient involvement (PPI), has been mainly applied to health service provision and health care decisions, (Boivin et al.,2014; Cowen et al.,2013, Hanley et al., 2004; Uhm et al., 2012) but to a lesser extent toward population-level public health policy

(Nilsen et al.,2007). Engaging consumers in healthcare decisions (Boivin et al. 2014), and research priority setting is feasible and has generated meaningful research outcomes (Oliver et al., 2004, Oliver et al., 2009, Viergever et al.,2010). However, there are few defined platforms for public engagement in the prioritisation of health policy (Degeling et al., 2015; Jolley, 2012; Stewart et al., 2016) and the value of these methods in the given context is one of debate (Davey, 2015; Degeling et al., 2015; Hobley, 2012; Oliver de Vocht., 2015; Sharma et al., 2015) given the relatively limited research conducted in this space (Degeling et al., 2015; Nilsen et al., 2006). There is scope to enhance the rigour of consumer engagement methods and clarify the concept of public involvement in obesity and health-related policy decisions (Illot 2015; Li et al., 2015; Sharma et al., 2015).

Public mobilisation toward obesity-related policies is essential (Huang et al., 2015), and these results support the utility of including interested consumers in consultations around appropriate policy responses. Further, the findings indicate that industry perspectives are a point of difference in multi-stakeholder engagement efforts, and support that industry views significantly differ from consumer perspectives. There is a defined gap in evidence about the effects of consumer involvement in health policy decisions or how to effectively apply such methods in practice (Nilsen et al., 2006). It is imperative that meaningful consumer engagement methods are explored and applied as a potentially effective tool to progress population-level government regulation to protect public health.

5.5 Strengths and limitations for Chapter 5

This research provides a pragmatic, applied insight into real-world advocacy for government-led policy to address obesity in the Australian context. The analysis of submissions made to the inquiry provided a nationally relevant sample representing the diversity of stakeholders to obesity in a readily available format for analysis.

In identifying limitations, the authors acknowledge the date of the Inquiry, which was the most recent federal inquiry in Australia; however, scarce implementation of fundamental components of the Australian preventative health strategy developed in response to this Inquiry, supports the ongoing relevance of understanding barriers to implementation to advance progress toward national health targets (Moodie et al., 2016). Furthermore, a comparison to recommendations made in recent national and global advocacy (WHO 2013;

WHO 2016a, VicHealth 2016) illustrates clear alignment with current stakeholder advocacy. Considering recent events and likely enhanced awareness of the severity of the obesity epidemic, one could predict that support for bolder policy actions, including those which greatly reduce individual autonomy may be more prevalent currently, than when the data for this study was obtained.

The analysis explores the impact on autonomy, setting and behaviour as variables to obesity prevention interventions. While the association between these variables and stakeholder support is remarkable, the independent influence of autonomy on support should be interpreted with caution. A number of policy characteristics are acknowledged as contributors to acceptability, (Diepeveen et al., 2013) and therefore the concept should be valued as an addition to the larger portfolio of drivers to acceptability for public health policy.

The sample used in the analysis was limited to stakeholders who were motivated to submit to the government Inquiry. The use of a sample from alternative methods that engage consumers, such as public opinion surveys, (Barry et al., 2013) may have resulted in wider representation of stakeholders including individuals less likely to contribute to a formal government inquiry, such as children. However, the submissions provided an engaged, information-rich sample, which aligns with the primary objective of this research: to explore recommendations *'made directly to the Australian Government'* Inquiry.

Analysis of stakeholder policy advocacy does not provide intelligence about the most effective or efficient policy responses to address obesity. It does provide insights about political acceptability and the various vested interests that influence policy responses. Both the framework and theory applied in this study are subject to interpretation of the concepts described, and therefore further investigation into stakeholder perceptions of the concept of autonomy and intrusion to choice is required.

5.6 Conclusion and implications of Chapter 5

The findings of this study validate the utility of the impact on autonomy, as proposed by the Balanced Ladder framework, for assessing obesity-related policy options, and identifying similarities and differences between stakeholder group perspectives. Viewing the options through an autonomy lens may provide a means for policy makers to predict stakeholder

resistance, and the interplay of setting, target behaviour and stakeholder perspective in the association between autonomy and support gives rise to further opportunity to explore policy options tailored to these variables. Reframing regulation according to *individual* and *industry* autonomy may be a valuable driver for systems change. Furthermore, actively seeking the views of underrepresented stakeholders may rebalance the debate and increase support toward bolder policy actions. Further research around stakeholders' interpretation of these concepts is required to gain greater insight into the role of autonomy as a barrier to implementation, and as a point of difference between stakeholder group perspectives.

CHAPTER 6: EXPLORING STAKEHOLDER CONSENSUS ON POLICY INTRUSIVENESS AND IMPACT ON AUTONOMY IN THE CONTEXT OF OBESITY PREVENTION POLICY

6.1 Preamble

The previous chapters have presented evidence of the relevance and applicability of the concepts of intrusiveness and autonomy to existing obesity-prevention research and advocacy. The chapters emphasise the value of considering these concepts within obesity-related policy research, particularly where industry lobbying influences the acceptability of proposals, and public and political will hinder the application of potentially effective policies in practice. The findings presented in Chapter 5, suggest that preferences regarding the level of government influence on autonomy may be a point of difference between stakeholders, particularly between industry and consumers, and to the greatest extent when considering food-related policy options. This is likely to be a result of the contention of powerful commercial perspectives. Subsequently, Chapters 6 and 7 draw upon the presented findings and existing research, to explore further the interpretation of the two ethical concepts in the context of obesity-related food policy options, from the perspective of underrepresented stakeholders. The study presented employs novel methodology which contributes to research on stakeholder engagement methods in public health policy, whilst simultaneously contributing evidence to the specified aim of the thesis.

This study has been divided into two chapters and represents three manuscripts. The first entitled '*Modified Policy-Delphi study for exploring obesity prevention priorities'* details the protocol and was published in *BMJ Open* in September 2016. This is presented in the Appendix 6 (Document A6.2). Two manuscripts are currently under peer-review. The first entitled *'Stakeholder perceptions of obesity-related food policy options for Australia: A modified-Policy Delphi study*' describes the quantitative findings and is under review at *Public Health Nutrition*. This is presented in Chapter 6, in addition to the overall aim and objectives, and detailed methodology. The second entitled '*Perceptions of policy intrusiveness and impact on autonomy: Considerations for obesity-related policy in Australia'* describes the qualitative findings and is under review at *BMC Public Health*. This

is presented in Chapter 7 which concludes with amendments to protocol (7.8) and a summary of the overall study represented by both chapters (7.9).

6.2 Study design

6.2.1 Aim and objectives

This study aimed to explore consensus on the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, of obesity-related food policy options, from the perspective of consumers, practitioners and policy makers in Australia. There were four core objectives:

1. Identify the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for a range of policy options representing the levels of the Nuffield Ladder of Intervention (the Ladder), according to participants.
2. Identify the degree of consensus amongst participants, regarding perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for each policy option.
3. Compare participants' classification of policy intrusiveness and impact on autonomy with the classifications according to two ethical frameworks (the Ladder (Nuffield, 2007) and Balanced Ladder (Griffiths & West, 2015).
4. To identify potential contributors to individual perceptions of these concepts, to understand the reasons for differing perspectives and conflict with group consensus.

6.2.2 Detailed methodology

Consensus and appraisals methods, such as the Delphi technique, have been successfully applied to explore priorities for public health issues, where evidence for effective policy is inconclusive (Faulkner et al., 2012, Stebler et al.,2015, Owens et al.,2008).

The Delphi technique, in its original form intends to gain consensus amongst 'experts' on strategic priorities where there is a lack of empirical evidence (Dalkley 1967). The technique traditionally uses a rank or rate approach to assess a variety of options. These options are delivered in consecutive rounds of survey style questions and feedback, and reassessment is encouraged until consensus is gained; however modifications of the technique have enabled

application to a variety of situations and topics. In the context of obesity, the Delphi has been successful in identifying priorities from a solo perspective of 'experts' (Faulkner et al., 2011), but in light of the diversity of stakeholders involved in the debate, there is possibility to broaden the scope of 'expertise' to share opinion across diverse perspectives including local communities (Rideout et al., 2014, Owens et al., 2008). Anonymous sharing of group opinion allows participants to 'benchmark themselves' against peer's response (Meskell., 2013), and share opinion without potentially destructive group dynamics (Murphy et al.,1998). However, the diversity of priorities, shaped by vested interests, exposure, experience, and knowledge is extensive, and therefore achieving consensus on priorities between stakeholders for obesity may be unrealistic (Owens et al., 2008).

One modification is the Policy Delphi; this variation explores consensus and dissent, rather than aiming to achieve consensus (Turoff, 1970) and provides flexibility over the classic Delphi technique to enable diverse application to various situations (Meskell et al., 2014, Williams et al., 1994). The approach can be used to map overlapping priorities from different perspectives and identify mutual priorities across stakeholder groups and therefore is a valuable exercise for investigating complex public health issues such as obesity (von der Gracht., 2012, Meskell et al., 2014, Turoff, 1970). The technique facilitates an in-depth investigation which may detect limitations, considerations and consequences of policy options which may enhance the value and success of policy implementation (Pratt, 2003, Meskell et al., 2014). The diversity of stakeholders involved makes reaching consensus on priorities less feasible (Owens et al., 2008), however, mapping perspectives may identify mutual concepts behind the most agreeable options to inform future research and practice. The technique provides an opportunity for participants to contribute equally, and offer additional options and comments throughout; in this respect it gives all participants, including consumers, a voice in the complex debate (Meskell et al.,2013).

Stakeholder engagement

The public are underexploited in policy advocacy and the decision making process (Huang et al., 2015), however experts recognise the value of the 'consumer voice' in ensuring acceptable, relevant decisions are made in both primary care and the wider political environment. Indeed, a bottom-up approach is required to mobilise policy action and ensure that decisions are being made in the interest of public health (Huang et al., 2015) and

therefore a growing proportion of health research is engaging patients to identify priorities for research and practice and inform decisions, particularly toward medical treatment (Boivin et al., 2014, Cowen et al., 2013, Hanley et al., 2004, Oliver & Gray 2006, Owens et al., 2008, VicHealth 2015, Wilson et al., 2014). In obesity policy, the voice of consumers is rapidly becoming a more integral component to effective research on the priorities for action (Lobstein et al., 2007, VicHealth, 2016), however, the translation of the findings into practice remains inadequate.

The James Lind Alliance advocates the value of patient-centred practice for identifying research gaps regarding treatment for health conditions. The approach, termed 'Priority Setting Partnerships'(PSP), was developed to bring the perspectives of the patient, carer and practitioner together, in isolation of vested interests, through transparent methodology, to identify treatment uncertainties which are important to both groups. The underlying principles of the PSP method, such as enabling transparency, enhancing consumer voice and reducing the influence of industry in decision making, are relevant to what is required to prioritise obesity policy in Australia.

This research employs Policy Delphi methodology, modified and informed by the underlying principles of the James Lind Alliance approach to collaborative priority setting, in the context of a growing movement supporting greater consumer-involvement in healthcare and policy research (Boivin et al., 2014, Cowen et al., 2013, Florin & Dixon, 2004, Nilsen et al., 2007, Wilson et al., 2014). The intent of the policy-Delphi to explore rather than gain consensus is particularly relevant to the study objectives; however the modifications outlined, including the classification of consumers as 'experts' may be subject to scrutiny around the true concept of the traditional Delphi method (von der Gracht, 2012). The recent movement toward consumer-engagement in health research and policy development suggest that all members of society may possess expertise in the acceptability of public policy implementation, whether through knowledge, experience or purely exposure to the lived environment (Boivin et al., 2014, Hanley et al., 2004, Owens et al., 2008, Paul et al., 2008, Queensland Government 2005, Rychetnik et al., 2014, VicHealth, 2016). Involving policy makers was considered integral to the successful translation of the findings to practice, however we anticipate some diversity between groups abilities to prioritise effectively and discriminate between options (Owens et al., 2008). To enhance the usability of the data, we

will encourage all participants to use the full scale provided and consider their choice as rankings as well as ratings (Owens et al., 2008).

Vested interests

This study sought the perspective of underrepresented groups namely, consumers and health practitioners, alongside policy makers, in isolation from industry and academic perspectives, in an effort to remove vested interests and rebalance the debate. A conflict of interest occurs when a secondary interest overly influences a primary interest (Lo, 2009), hence an obvious example of conflict of interest amongst industry perspectives which influence policy decisions, is that of financial interest. The food industry is powerfully represented in food and health-related policy decisions (Clarke et al., 2016, Cullerton et al., 2016b), and their financial conflict of interest on such policies is widely acknowledged. Therefore, the rationale for excluding industry perspectives from obesity-related policy research is underpinned by an extensive portfolio of evidence (Cullerton et al.,2016b, Lesser et al., 2007, Lundh et al.,2012, Nestle 2016).

The influence of academics in policy decisions is questionable (Lewis, 2006, Cullerton 2016b), and vested interests amongst academics, may be questioned. The role of academics in obesity-related policy decisions is, essentially, to provide evidence for the effectiveness of potential strategies. The current study explores stakeholder views as an alternative way to shape policy in the absence of evidence of effectiveness; and thus provides a novel contribution to the wider evidence base which is substantially influenced by academic perspectives. A large number of academics are involved in setting obesity policy in Australia and receive significant government support to do so, through NHMRC funding for research and centres of academic excellence (NHMRC, 2015). The views of academics are regularly sought for research purposes, and this is exemplified by their participation in current policy prioritisation activity in Australia (Sacks et al., 2017). Furthermore, the governments expert advisory group for obesity which directly informs ministers on aspects of public health policy, is almost entirely composed of academics, with a much lower proportion of non-academic representatives (Aus Gov, 2015). It is therefore arguable that academics are an underrepresented group in the context of obesity-related policy in Australia (Cullerton., 2016b, Lewis, 2006).

Additionally, the potential for commercial investment amongst academics further emphasises the importance of excluding these views in the context of this studies' objectives (Newton et al.,2016). Commercial conflicts of interests amongst academics has been shown to significantly influence the outcomes of research published in the context of food policy. (Bes-Rastrollo et al.,2013) Such has strong implications on the validity of research publications, and the subsequent impact on policy decisions, however the primary concern in the context of this study, is the potential for academic perspectives to represent industry interests and introduce bias to the sample. Furthermore, industry representatives have questioned the neutrality of academic position which is primarily interested in publishing research which is considered valuable to journal editors, and which generates financial revenue (Annison, 2016) thus conflicts of interest inherent amongst academics, aside from those related to industry may also be important considerations.

Given the considerable opportunity for academics to contribute to policy debate, their participation in current policy prioritisation activity in Australia (Sacks et al.,2017) and the risk of conflict of interest amongst academics, both commercial or otherwise, the exclusion of academics was deemed appropriate in line with the underlying principles of consumer engagement research (Cowen & Oliver, 2013). The perspective of industry and academics is acknowledged as valuable in the wider context of successful implementation of policy, however, the objective of this research was to bring forward the underrepresented views independent from vested interests to gain insight into their valuable perspectives.

Detail of the design of the study has been published (Haynes et al., 2016; Appendix 6: Document A6.2).

6.3 Study implementation

The following manuscript entitled '*Stakeholder perceptions of obesity-related food policy options for Australia: A modified-Policy Delphi study*' describes the quantitative findings and is under review at *Public Health Nutrition*.

6.3.1 Abstract

Government leadership to reverse obesity in Australia is urgently required. However, progress is hindered by conflicting stakeholder priorities and advocacy actions, often from those with vested interests. One strategy used by the food industry is to frame policy in a light that is ethically inappropriate and intrusive. As public support and political will influence policy adoption, collaborative research methods which bring forward these perspectives, in isolation from industry, may strengthen pathways to action. This three-round Policy Delphi study recruited consumers (n=20), practitioners (n=26) and policy makers (n=18) to explore consensus on the perceived intrusiveness, impact on autonomy, effectiveness and level of priority of 53 obesity-related food policy options, informed by the Food-EPI tool. The IQR and median were calculated to indicate consensus (defined as IQR≤1) and convergence toward consensus between each round. The key findings demonstrate a high-level of consensus amongst these stakeholders on 94 to 98% of food policy options for the four concepts explored. Most policy options were considered nonintrusive, effective, and perceived to have a negligible or positive impact to individual autonomy. This contrasts with the classifications of ethical frameworks and assumptions driven by commercial interests. Seeking the perspectives of underrepresented stakeholders has dispelled misconceptions that are barriers to policy implementation.

6.3.2 Background

The cost of obesity and nutrition-related chronic disease is extensive at an individual and population level. Diet is the leading contributor to non-communicable disease (NCD) in the world (GDB, 2015), and as no country has been successful in reversing obesity (Ng et al., 2013), urgent action is required. Food systems, and consequentially food environments, are integral in determining dietary quality (GLOPAN, 2016). The World Health Organisation has

called for cohesive strategies, led by national governments, to modify food systems to promote healthy food choices. Despite this, Australia remains without an endorsed national obesity or nutrition strategy, and the implementation of obesity-related polices has been largely limited to self-regulatory interventions which emphasise individual responsibility (Swinburn et al.,2015). Whilst there have been advancements to reduce obesity and nutrition-related chronic disease around the world (Cochero et al., 2017, Corvalán et al., 2013, Jensen et al., 2016, WHO, 2016c) progress is unacceptably slow, and experts continue to appeal to the Australian government for action (Mitchell, 2017, Obesity Policy Coalition, 2017, Sacks et al., 2008, Swinburn & Wood, 2013).

Obesity-related behaviours are a product of a large and complex system influenced by many sectors (Foresight, 2007) . Governments are challenged by a diverse portfolio of policy options, known to be complex, and hampered by the politics of conflicting stakeholder priorities and advocacy actions, often from those with vested interests. For obesity policy, advocacy is often centred on the ethical concerns about government interference or 'intrusion' to individual choice particularly where there is a lack of high-level evidence to justify population-wide approaches (Campbell et al, 2000, Crammond et al., 2013, Jochelson, 2006, Kite et al., 2015, Mayne et al., 2015, Nuffield Council, 2007, Yoong et al., 2014). This mainly hinders the adoption of policies that are considered most intrusive (such as regulations which restrict access to unhealthy food), given the heightened demand for, and difficulties in obtaining, robust evidence to outweigh potential costs to liberty (Nuffield Council, 2007). However, the regressive nature and harmful consequences of the current obesogenic environment, calls into question the ethics of waiting for better evidence (Barnhill, 2013, Buchanan, 2013, Griffiths & West, 2015, Thaler & Sunstein, 2003), particularly as the power of evidence to influence the policy process is debatable (Clarke et al, 2016) . Consequently, positively reframing policies by their potential impact on autonomy, rather than intrusiveness has been suggested amongst alternative approaches to strengthen political support (Griffiths & West, 2015), and reduce the influence of corporate political activity, which is central to policy adoption in Australia (Cullerton et al., 2016[b], Mialon et al., 2017).

In the context of obesity-related food policy, public, political and commercial priorities often conflict. Potential approaches are often dichotomised by the policy actors, which leads to polarised opinions. Despite efforts to harmonise divergent beliefs, obesity cause and management continues to be viewed from either an individual or systemic frame (Roberto et

al., 2015) which may influence individuals when considering the acceptability of government intrusion to choice (Diepeveen et al., 2013). Where policy framing, public support and political will are considered important influences to policy adoption, collaborative research methods which unite these stakeholders, independent of commercial influences, are increasingly valued in health research (Boivin et al., 2014, Cowen & Oliver 2013, Hanley et al., 2004, Huang et al., 2015, Oliver et al., 2004, Oliver & Gray, 2006, Queensland Government, 2005, VicHealth, 2016, Wilson et al., 2014). As the public are underexploited in policy decisions (Huang et al.,2015), bringing forward their perspective is integral to meaningful research outcomes (Boivin et al.,2914, Oliver et al., 2004) and collaborating with policy makers may result in more successful translation of research to obesity policy (Choi et al., 2016, Oliver et al, 2014).

Aim

This study aimed to explore consensus on the perceived intrusiveness, impact on autonomy, effectiveness and level of priority of obesity-related food policy options, from the perspective of consumers, practitioners and policy makers in Australia. More specifically this study set out to:

1. Identify the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, of a range of policy options representing the levels of the Nuffield Ladder of Intervention (the Ladder), according to participants.
2. Identify the degree of consensus amongst participants, regarding perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for each policy option.
3. Compare participants' classification of policy intrusiveness and impact on autonomy with the classifications according to two ethical frameworks (the Ladder (Nuffield Council, 2007) and Balanced Ladder (Griffiths & West, 2015)).

6.3.3 Method

Study methods have previously been described in detail elsewhere (Haynes et al.,2016) (Section 6.2; Appendix 6: Document A6.2). In short, a three-round online policy-Delphi

survey was conducted. The online method was chosen as it facilitates collaboration of participants across a large geographical area, and provides a platform without the common limitations of face-to-face research techniques (Turoff, 1970). In addition, given the potential for conflicting opinion between stakeholder perspectives, and the potential for the ethical concepts of interest to instigate a strong or emotional response, an online method was considered best for enabling consistent and fair consideration of all participants' opinions, without the risk of discourse from strong characters or domineering perspectives.

Survey development

A 45-item list of obesity-related food policy options was developed and presented using an online platform (Qualtrics, Provo, UT, USA). The list was informed by the Food-EPI; a high quality tool (Phulkerd et al., 2016) relevant to national food policy options (Vandevijvere et al., 2014). To ensure a comprehensive account of the concepts of interest, the list was designed to exemplify policy options of all levels of the Ladder (Nuffield Council, 2007) and Balanced Ladder (Griffiths & West, 2015) frameworks (Chapter 1;Table 1.2). The 45 options were presented in matrix table format, with four 5-point Likert scales to rate the option against: effectiveness (very effective to very ineffective), intrusiveness (highly intrusive to very nonintrusive), impact to autonomy (greatly enhances to greatly reduces) and level of priority (very high to very low).

Consistent with the policy-Delphi methodology (which varies from the traditional Delphi method), a 'neutral' rating was not included as an option in the Likert scales for two of the concepts, in order to encourage participants to choose and identify where opinion conflicts (Turoff, 1970). Exception was made for the impact to autonomy where 'no impact to autonomy' could be chosen in line with the Balanced Ladder framework, and for effectiveness where participants could rate 'unsure' (Turoff, 1970).

Recruitment

A convenient sample of information-rich, interested participants were recruited by email invitation, which was circulated across government and non-government organisations and consumer engagement networks in August 2016. Interested participants were asked to forward the study details to others to enable 'snowballing'. Individuals were screened against

the study inclusion criteria (Box 6.1) and consent was implied by the provision of personal details (Appendix 6: Document A6.1).

Box 6.1: Inclusion and exclusion criteria (Haynes et al., 2016).

Inclusion criteria

1. Adults over 18 years of age.
2. Australian resident (we will aim to recruit representation across states).
3. English speaking.
4. Able to provide voluntary consent.
5. Access to a computer, tablet or electronic device and an internet connection to enable completion of the online survey.
6. Must exclusively meet one of the following group inclusion criteria:

a. **Public health practitioner**: Individuals must be employed by an organisation recognised as relevant in obesity (ie, NGO, health professional).
b. **Policy maker:** (including representatives from government departments, or non-government organisations): Individuals must be employed by a local, state or federal government level department and preferably hold a position concerning policy development, or employed by a non-government organisation and hold a position concerning policy development.
c. **Consumer**: Individuals must not meet any of the inclusion criteria for groups (a) and (b). They may represent the general community, and will include, for example, parents, workplace managers/staff and teachers.

Exclusion criteria

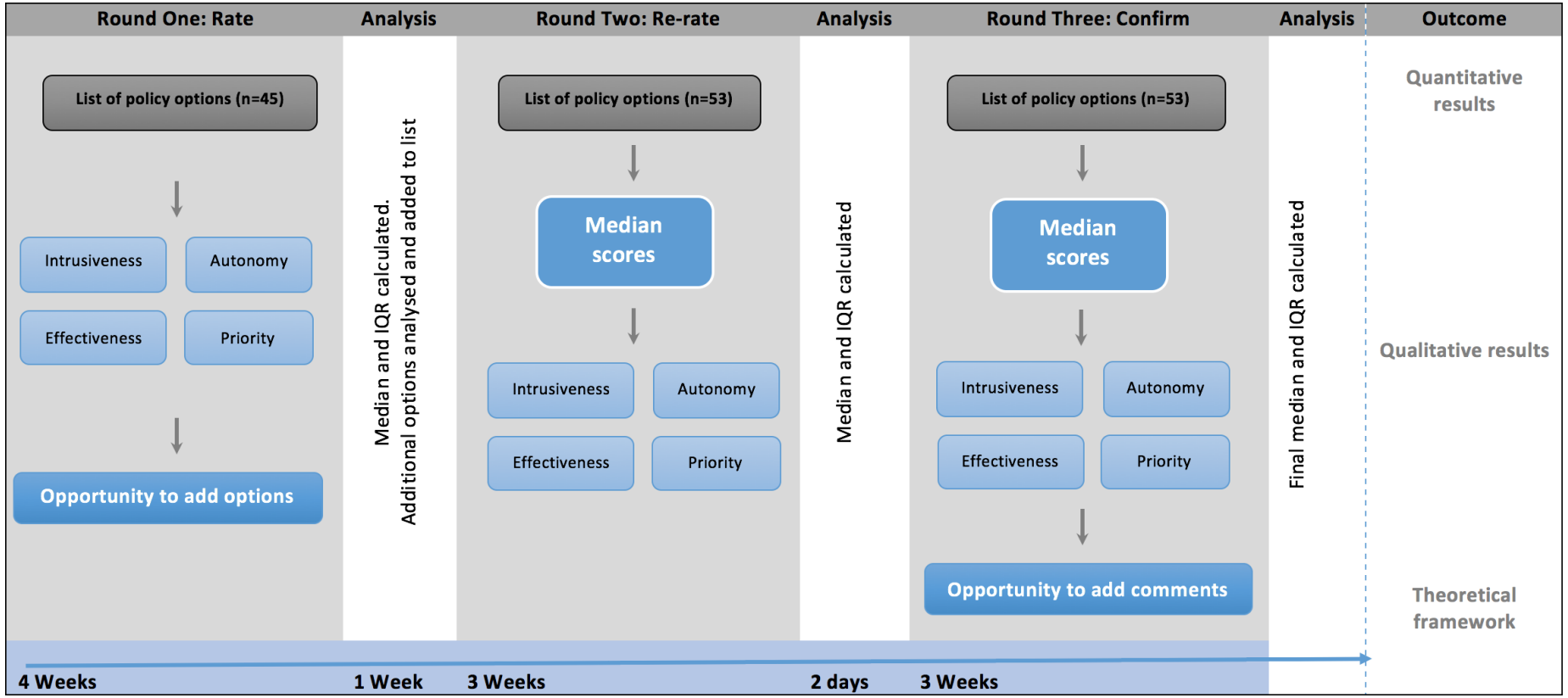
1. Individuals affiliated with industry through: employment; publicly declared competing interest; in receipt of funding which may influence their contribution; other recognised association.
2. Academics: defined as those employed in a research community who are not also public health practitioners or policymakers.
3. Any individual in receipt of funding which may influence their contribution to the prioritisation process.
4. People with a cognitive impairment that prevents them from providing informed consent and understanding the nature of the study.

Survey distribution

The survey was distributed online in September 2016 (Fig.6.1). During Round One, participants rated the options and submitted their responses via the online platform. The median and IQR were calculated for intrusiveness, impact to autonomy, priority and effectiveness of each option, and the survey was edited for the second round to include additional options suggested by participants in the first round. The survey was then re-distributed in Round Two, with each participant having their rating from the previous round as the default answer, and the median rating from Round One presented next to each individual option. Participants were then invited to re-rate the options. The median and IQR were again calculated, and the survey distributed for Round Three. During this final round, participants were invited to provide an optional comment to justify their rating for each

policy option (Appendix 6: Fig A6.1). A three-week timeframe for each round was allowed, with the policy-Delphi completed in 12 weeks, (Fig 6.1). The dates for each round of the process are as follows:

Fig 6.1: The policy Delphi process and timeline*



**Key dates*: 29th August (recruitment began), 7th September (round one surveys distributed), 28th September (recruitment and round one survey distribution ends), 11th October (final data collection for round one), 18th October (round two launched), 9th November (final data collection for round two), 11th November (round three launched), 2nd December (completed data collection).

Data analysis

The responses to each round were analysed using descriptive statistics. The median and interquartile range (IQR) were chosen to report the typical rating and spread in distribution for each policy option, by each concept (de Loe, 1995, Murphy et al, 1998, Owens et al., 2008). The IQR was employed to indicate the level of consensus after each round (Owens et al., 2008, Raynes & Hahn, 2000), and the relative IQR indicated the level of convergence toward consensus between rounds (Ray & Sahu, 1990). Stability of consensus was defined by <10% shift in any category and used in conjunction with IQR to determine strength of consensus (von der Gracht, 2012). Finally, the direction of consensus was calculated by collapsing contiguous categories (Appendix 6, Table A6.1-A6.4) (de Loe, 1995, O'Loughlin & Kelly, 2004), and assigned a level of consensus using percentages (Meskell et al., 2013). Each policy option presented in the survey was classified according to the two pre-defined frameworks; the Ladder (Nuffield Council, 2007) and Balanced Ladder (Griffiths & West, 2015) (Chapter 1; Table 1.1) and these classifications were compared to the participants final round ratings. Summative content analysis was conducted on the additions provided by participants in round one to identify new options not represented by the original forty-five. Deeper qualitative analysis was undertaken on comments provided by individual participants in round three and is reported elsewhere (Haynes; unpublished results; *Chapter 7).*

6.3.4 Results

Sixty-four participants completed round one, from a total of 73 eligible participants (Table 6.1). Retention was high, with 97% of participants from round one completing all three rounds (Table 6.2). All policy makers completed the three rounds; one participant from each of the practitioner and consumer groups failed to complete round two and round three.

Nineteen additional options were added during round one, and these were grouped by similarity into eighteen categories, ten of which were already represented in the original 45 options provided. Eight new options were defined, using the same language as used by participants, and were added to the options list for subsequent rounds. These options were coded N1-N8. Further details are presented in Appendix 6 (Table A6.5).

Table 6.1: Demographics of participants

	All	Consumers	Practitioners	Policy makers
Total	**64 (100)**	**20 (31)**	**26 (41)**	**18 (28)**
Gender n(%)				
Male	8 (13)	4 (6)	2 (3)	3 (5)
Female	56 (87)	16 (25)	24 (38)	15 (24)
Age (Mean±SD)	45 ± 14	54 ± 14	39 ± 11	46 ± 13
State n(%)				
Queensland	30 (47)	6 (9)	6 (9)	8 (13)
Victoria	17 (27)	10 (16)	5 (8)	2 (3)
New South Wales	13 (20)	1 (2)	8 (13)	4 (6)
Tasmania	5 (8)	0 (0)	3 (5)	2 (3)
South Australia	4 (7)	0 (0)	3 (5)	1 (2)
Western Australia	3 (5)	1 (2)	1 (2)	1 (2)
Northern Territory	1 (2)	1 (2)	0 (0)	0 (0)
Australian Capital Territory	1 (2)	1 (2)	0 (0)	0 (0)

Table 6.2: Retention of participants

Stakeholder group	*Recruited (n)*	**Round 1 (n)**	**Round 2 (n; %)**	**Round 3 (n; %)**	**Comments (n;%)**
Consumer	*21*	20	19 (95)	19 (95)	14(74)
Practitioner	*31*	26	25 (96)	25 (96)	12(48)
Policy maker	*21*	18	18 (100)	18 (100)	13(72)
Total	*73*	64	62 (97)	62 (97)	40 (65)

Table 6.3 presents the median ratings and level of consensus for the four concepts for each policy option amongst all stakeholders in round three. Median ratings and level of consensus for individual stakeholder groups were also calculated (Appendix: Table A6.6, A6.7, A6.8, A6.9).

Table 6.3: *Median rating and level of consensus for intrusiveness, autonomy, effectiveness and priority for policy options according to all participants (policy makers, public health practitioners and consumers).*

Policy option	**Median ratings across all stakeholder groups and level of consensus***			
	Intrusiveness	**Autonomy**	**Effectiveness** (Sub-group)**	**Priority**
1.A single, consistent, front of pack, nutrition label aligned with standardised serving sizes of the Australian Guide to Healthy Eating.	Nonintrusive	Slightly increases	Effective **(Effective)**	High
2.Provide an 'endorsement symbol' to recognise if a food is healthy (for example, a green tick).	Nonintrusive	No impact	Effective **(Effective)**	Somewhat
3. Provide a 'warning symbol' to recognise if food is unhealthy (for example, a red cross).	Nonintrusive	No impact	Effective (**Effective)**	*Somewhat*
4. Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation.	**Nonintrusive**	No impact	Effective (Effective)	V.High
5. **Reduce** taxes on **healthy** foods (for example, low or no sales tax, excise, value-added or import duties on fruit and vegetables).	V. Nonintrusive	*Slightly increases*	Effective (Effective)	V.High
6. **Increase** taxes or levies on **unhealthy** foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods).	Slightly intrusive	No impact	Effective (Effective)	High
7. A single, consistent, nutrition label on menu-boards of quick service restaurants, which refer and align to serving sizes of the Australian Guide to Healthy Eating.	**Nonintrusive**	No impact	Unsure **(Effective)**	Somewhat
8. Restrict unhealthy food marketing and sponsorship in sports events and venues	**Nonintrusive**	No impact	Effective (Effective)	High
9. Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation.	Nonintrusive	**No impact**	V. Effective (V.Effective)	V.High
10. Regulate the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of **packaged foods** sold in Australia, with legislation.	Slightly intrusive	No impact	Effective **(Effective)**	Somewhat

11. Mandate that healthy food and drinks are strategically placed and promoted to encourage sales in all government-owned or funded public settings (for example at the cashier, at eye line in fridges/cabinets).	Nonintrusive	No impact	**Effective (Effective)**	High
12. Provide food-related income support programs for healthy foods (such as food stamps/vouchers, tokens and discounts in retail setting for food purchases).	Nonintrusive	**No impact**	Effective **(Effective)**	Somewhat
13. A compulsory national school package of policies and nutrition standards, to **increase healthy choices**, including a traffic light guideline system for canteen managers	Nonintrusive	**No impact**	Effective (Effective)	High
14. A compulsory national school package of policies and nutrition standards, to **limit** and **restrict** the provision and promotion of unhealthy foods (such as sugar-sweetened beverages, energy dense nutrient poor snacks).	Nonintrusive	**No impact**	Effective (Effective)	High
15. Provide government-subsidised healthy lunches and breakfast clubs in schools in vulnerable areas and communities (for example, Aboriginal and Torres Straight Islander communities, low income areas).	Nonintrusive	**No impact**	**Effective** (Effective)	High
16. Restrict the sale of unhealthy foods in government-owned or funded public settings.	Slightly intrusive	No impact	**Effective (Effective)**	High
17. Restrict the **promotion** of unhealthy foods in government-owned or funded public settings.	Nonintrusive	No impact	Effective **(Effective)**	High
18. Legislation to restrict the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of packaged foods sold in Australia.	*Slightly intrusive*	No impact	Effective **(Effective)**	Somewhat
19. Provide resources and training for staff in schools, hospitals and other **public** settings, to promote healthy food provision in their setting (for example, recipe cards, skills training, posters, evaluation toolkit).	**Nonintrusive**	**No impact**	Effective **(Effective)**	Somewhat
20. Provide resources and training for **private** companies, to promote healthy food provision in the setting (for example, recipe cards, skills training, posters, evaluation toolkit).	**Nonintrusive**	**No impact**	Unsure **(Effective)**	**Somewhat**
21. Introduce planning acts, which prevent hot food takeaways trading within 400m of schools and other key public settings (such as hospitals, sports/leisure centers).	Slightly intrusive	No impact	Effective **(Effective)**	Somewhat
22. Introduce planning acts, which restrict the number of hot food takeaways to 10% of total units per suburb.	*Slightly intrusive*	No impact	Effective **(Effective)**	Somewhat
23. Reduce license or permit requirements for local produce markets, greengrocers, healthy mobile outlets (carts) and food cooperatives, which provide fruit and vegetables.	Nonintrusive	No impact	Effective (Effective)	Somewhat
24. In retail environments, only allow healthy food to be the subject of in-store promotions (for example, price deals, end-of-aisle displays, checkouts, island bins, shelf and other signage).	Nonintrusive	No impact	Effective **(Effective)**	Somewhat

25. In retail stores, reduce the proportion of space dedicated to unhealthy foods (for example, less than 10% of space allocated for confectionary and sugar-sweetened beverages).	Nonintrusive	*No impact*	Effective **(Effective)**	Somewhat
26. Regulate the amount of saturated fat, sugar and salt in a standard serve of food and drink sold at all food service outlets through legislation (include all food outlets/vendors including takeaway and dine-in restaurants, cafes, coffee/snack outlets)	Slightly intrusive	No impact	Effective **(Effective)**	Somewhat
27. Restrict promotions on unhealthy foods/meals in food service outlets. Promotional activity only permitted for healthy choices.	Slightly intrusive	No impact	Unsure **(Effective)**	Somewhat
28. Regulate food promotion so that only healthy choices can be promoted in food service outlets.	*Slightly intrusive*	No impact	Effective **(Effective)**	**Somewhat**
29. Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship).	**Nonintrusive**	**No impact**	**Effective (Effective)**	**High**
30. Monitor the populations nutritional intake, nutritional status and other NCD risk factors (physical activity, smoking, alcohol consumption) every 5 years	Slightly intrusive	**No impact**	**Effective** (Effective)	High
31. Monitor children's BMI annually using a school measurement programme. The height and weight of all children will be taken in the first and last year of primary school (non-participation on an 'opt-out' basis).	Slightly intrusive	**No impact**	Unsure (Effective)	*Somewhat*
32. Strengthen visible political support for improving food environments by setting Australian targets, statements of intent from government and enhanced media coverage.	**Nonintrusive**	**No impact**	Effective **(Effective)**	High
33. Clear, evidence-based dietary guidelines which provide standard serving sizes for food labels, and are informed by an expert scientific committee.	**Nonintrusive**	No impact	Effective **(Effective)**	High
34. Strengthen policies which restrict commercial influences on policy decisions related to food environments.	**Nonintrusive**	No impact	*Effective* (Effective)	High
35. Provide a central health promotion agency for preventative health and a public health workforce to address nutrition-related health issues in Australia.	Nonintrusive	No impact	Effective (Effective)	High
36. Improve funding to research which targets improving food environments and reducing obesity.	Nonintrusive	**No impact**	**Effective (Effective)**	High
37. Develop a National Obesity Strategy which shares priorities, targets and objectives across sectors and states (to improve cross-government, cross-departmental co-ordination).	**Nonintrusive**	**No impact**	Effective (Effective)	*High*
38. Improve government to industry collaboration to develop and implement food policies.	**Nonintrusive**	**No impact**	Effective **(Effective)**	Somewhat

39. Improve government to civil society collaboration to develop and implement food policies (includes collaboration with consumers, non-government organisations and public health professionals).	**Nonintrusive**	No impact	Effective **(Effective)**	High
40. When negotiating trade agreements, assess the impact on nutrition and health of the Australian population (through a compulsory health risk impact assessment).	**Nonintrusive**	**No impact**	Unsure **(Effective)**	Somewhat
41. Strengthen the Australian government's capacity to govern international trade which influences food environments.	**Nonintrusive**	**No impact**	Unsure **(Effective)**	Somewhat
42. Introduce a Health Impact Assessment to be conducted on all government policies which prioritises them by their impact on population nutrition, health and reducing inequalities.	**Nonintrusive**	**No impact**	**Effective (Effective)**	High
43. Implement a community awards program, within settings, to encourage healthy food environments (for example, Healthy stars for healthy settings).	**Nonintrusive**	No impact	Unsure **(Effective)**	Somewhat
44. Improve governments social marketing campaigns to promote dietary guidelines and a healthy weight (through TV, radio, news media, web-based, billboards, posters).	Nonintrusive	No impact	Effective **(Effective)**	High
45. Make food/nutrition education a stand-alone subject in schools, embed into other subjects of the national curriculum, and develop mandatory 'Core Food Competencies' for children to meet by the end of pre-school, primary and secondary school.	**Nonintrusive**	**No impact**	Effective (Effective)	High
N1. Revise the proportion of carbohydrate, protein and fat recommended by the national dietary guidelines (Australian Guide to Healthy Eating).	**Nonintrusive**	**No impact**	Unsure **(Effective)**	*Somewhat*
N2. Deliver local community food and nutrition education programs tailored to local environments (including healthy food options for obesity and related health conditions, cooking skills and reading nutritional labels).	**Nonintrusive**	No impact	**Effective** (Effective)	Somewhat
N3. Provide kitchen garden programs in all schools to improve children's cooking skills.	**Nonintrusive**	No impact	**Effective** (Effective)	High
N4. Education and resources for journalists and media organisations to reduce publication of poorly-evidenced or misinterpreted information in the media.	**Nonintrusive**	No impact	Effective **(Effective)**	Somewhat
N5. Government to lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice	Intrusive-Slightly intrusive	**No impact**	Unsure (Effective)	Somewhat
N6. Employ nutritionists as part of the Department of Education to deliver nutrition education to public, private, primary and secondary schools.	**Nonintrusive**	**No impact**	Effective **(Effective)**	Somewhat
N7. Develop a tool for consistent evaluation of the success of obesity-related strategies that are implemented	**Nonintrusive**	**No impact**	Effective **(Effective)**	Somewhat
N8. Deliver a community wide incentive program for healthy choice. Individuals collect points and rewards for making a healthy choices in local retail outlets (i.e. discounts on leisure activities).	Nonintrusive	No impact	Unsure (Effective)	Somewhat

* Consensus key: Bold text indicates high level consensus (IQR 0), standard text indicates good consensus (IQR <1), and italics indicates no consensus (IQR >1).(Owens et al., 2008, Rayens & Hahn, 2000). Options N1-N8 are those presented by stakeholders in Round one.
**Sub-group results refers to the median and level of consensus amongst those who were not 'unsure' with regard to effectiveness

Generally, a high degree of consensus was achieved amongst all participants on each option and concept (Table 6.3). Consensus was achieved (IQR≤1) in classifying intrusiveness (n=50; 94%), priority (n=50; 94%), impact to autonomy (n=52; 98%) and effectiveness (n=52; 98%) of options. Participants converged to the greatest extent when rating intrusiveness, and least when rating impact to autonomy (Table 6.4); however, for the latter consumers converged to a much greater degree, compared to policy makers and practitioners (0.23; 0.08; 0.08). Generally, policy makers converged the most and practitioners the least (Table 6.4).
Option 29 was the only option to gain 'high' level consensus (IQR=0) on all four concepts. This option referred to monitoring industry's compliance with standards and restrictions on food provision, labelling, and promotional activity, and was classified a nonintrusive, effective, high priority option which would have no impact on autonomy.

The options which achieved the highest level of consensus on autonomy (n=22) and intrusiveness (n=23), are classified as low level (less intrusive) and to have little or a positive impact on autonomy according to the Ladders, except two options; one school-based policy (option 14) and one incentive (option 12). Two of the three options which failed to achieve consensus for intrusiveness are classified by the Ladder as most intrusive (option 18 and 22). The two which failed to achieve consensus for autonomy are both considered to reduce autonomy according to the Balanced Ladder (option 25 and 5).

Table 6.4: Level of convergence* toward consensus

	Intrusiveness	**Autonomy**	**Effectiveness**	**Priority**	**Mean convergence**
All participants	0.20	**0.09**	0.15	0.16	0.15
Policy makers	0.25	0.08	0.19	**0.27**	0.20
Practitioners	0.16	0.08	**0.06**	0.07	0.09
Consumers	0.21	**0.23**	0.22	0.09	0.19

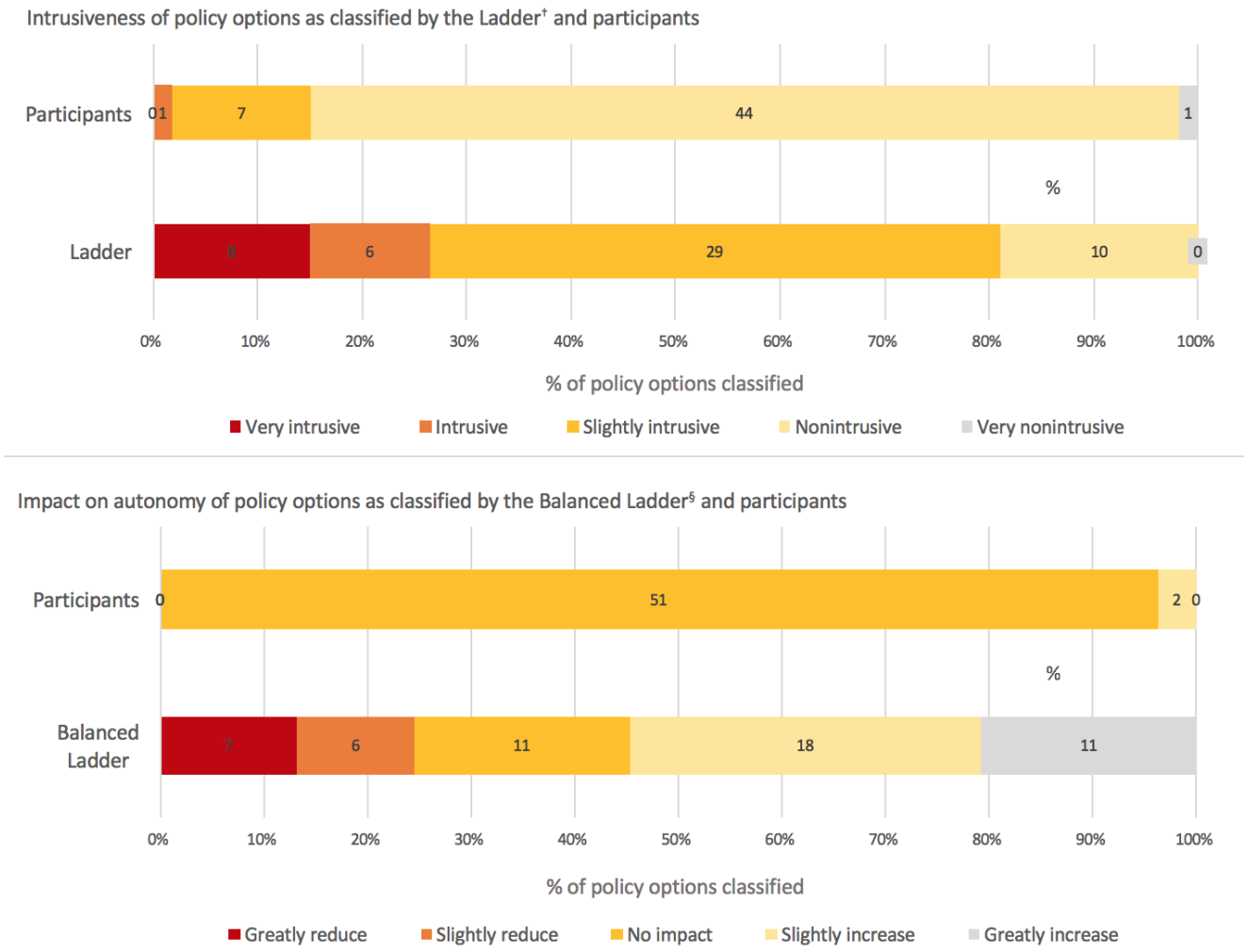
**Convergence is determined by calculating the relative IQR between rounds one and three; a value of > 0 indicates incremental convergence, 1 equals the highest level of convergence toward consensus and <0 indicates divergence from consensus between rounds .*

Intrusiveness & Autonomy

The majority of the options presented were rated as nonintrusive and of no impact to autonomy (n=39; 74%). One option, added by participants in round one, achieved consensus as 'intrusive' (*'…lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice'*) and eight more achieved consensus as slightly intrusive (Table 6.3). All nine options were classified across various levels of the Ladder framework; from monitoring on the lowest rung, to restriction on the highest, and relate to a wide variety of policy areas including food composition, promotion, pricing, provision and retail, in addition to monitoring and intelligence (Appendix: Table A6.11).

When comparing participant ratings for policy options to the frameworks, a large proportion did not agree with the classifications of the Ladder and Balanced Ladder frameworks. Participants classified most options as very non-or nonintrusive (n=45;85%), very few as slightly intrusive (n=7;13%), and one as intrusive in contrast with the Ladder classifications which considered the majority to be intrusive to a degree (nonintrusive (n=10;19%), slightly intrusive (n=29;55%), intrusive or very intrusive (n=14;26%); Fig 6.3). Similarly, the options were considered to slightly increase (n=2;4%) or have no impact on autonomy (n=51;96%) according to participants, whilst the Ladder classification denoted a greater impact (greatly or slightly reduce autonomy (n=13;25%), no impact on autonomy (n=11;21%), greatly or slightly increase autonomy (n=29;55%); Fig 6.2).

Fig. 6.2: *Participants ratings compared with classification according to ethical frameworks. Legend: † Nuffield council on Bioethics 2007; § Griffiths et al 2015*



Regarding the impact on autonomy, a similar number of options achieved consensus within each stakeholder group (consumers n=48, policy makers n=49, practitioners n=49) (Table A6.10). In rating intrusiveness, policy makers and practitioners gained 'high' level consensus on twice as many options as the consumers (n=26, n=26, n=13), and the latter failed to achieve any consensus on more options than practitioners or policy makers (n=13;25%,n=6;11%, n=2;4%) (Appendix: Table A6.11).

Effectiveness

Thirteen options were classified as effective or very effective and gained 'good' consensus amongst all participants (>80%) (Box 6.2). Twenty-seven percent of participant ratings for effectiveness were 'unsure'. Consumers were least likely and policy makers were most likely to rate 'unsure' (32% of policy maker responses, 27% of practitioners and 24% of those from consumers).

Forty-three options were considered effective (81%), and 10 were classified as 'unsure' (19%). A sub-analysis, which removed 'unsure' scores demonstrated consensus on all 53 options as effective. '*Restricting the exposure and power of unhealthy food promotion to children in broadcast media through legislation'* was considered the most effective option which reached 'high' consensus as 'very effective' amongst 95% of all participants, and 100% of those who weren't unsure.

Within stakeholder groups, there was 'good' consensus on the effectiveness of all options, with one exception. Consumers failed to achieve consensus on one additional option provided by participants in round one which represented a community-wide points incentive program for healthy choice. 'High' level consensus on effectiveness was achieved more frequently by policy makers, than practitioners or consumers (n=42, n=29, n=23), and practitioners were most likely to converge on this concept (Table 6.4).

Box 6.2: Policy options which gained 'good' consensus as effective/very effective amongst participants (>80%)

Policy option	% of participants (rating very effective or effective)	Group median score
• Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation.(Option 9)	95	V.Effective
• A compulsory national school package of policies and nutrition standards, to limit and restrict the provision and promotion of unhealthy foods (such as sugar-sweetened beverages, energy dense nutrient poor snacks). (Option 14)	92	Effective
• Reduce taxes on healthy foods (for example, low or no sales tax, excise, value-added or import duties on fruit and vegetables). (Option 5)	90	Effective
• Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation. (Option 4)	89	Effective
• A compulsory national school package of policies and nutrition standards, to increase healthy choices, including a traffic light guideline system for canteen managers. (Option 13)	89	Effective
• Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship). (Option 29)	89	Effective
• Increase taxes or levies on unhealthy foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods). (Option 6)	89	Effective
• Improve funding to research which targets improving food environments and reducing obesity. (Option 36)	85	Effective
• Make food/nutrition education a stand-alone subject in schools, embed into other subjects of the national curriculum, and develop mandatory 'Core Food Competencies' for children to meet by the end of pre-school, primary and secondary school. (Option 45)	84	Effective
• Provide government-subsidised healthy lunches and breakfast clubs in schools in vulnerable areas and communities (for example, Aboriginal and Torres Straight Islander communities, low income areas). (Option 15)	82	Effective
• Restrict the sale of unhealthy foods in government-owned or funded public settings. (Option 16)	82	Effective
• Mandate that healthy food and drinks are strategically placed and promoted to encourage sales in all government-owned or funded public settings (for example at the cashier, at eye line in fridges/cabinets). (Option 11)	82	Effective
• Restrict unhealthy food marketing and sponsorship in sports events and venues. (Option 8)	81	Effective

Priority

Box 3 illustrates 21 policy options which achieved consensus as high priority options. The median scores suggest that regulation around the exposure and power of unhealthy food promotion to children, both in broadcast and non-broadcast media were considered very high priority options. Five options gained 'high' consensus as high priority. These included the fiscal policy options, to tax unhealthy foods and reduce taxes on healthy foods (option 5 and 6) and both options regarding a national school package of policies and standards, one to increase healthy choices and the other to limit and restrict the provision and promotion of unhealthy foods (option 13 and 14). Finally, 84% of participants agreed that monitoring industry's compliance with standards and restrictions on food provision, labelling, and promotional activity was a high or very high priority option (option 29). A further six options achieved 'moderate' consensus (>70%) and eight 'low' consensus (>60%).

Box 6.3: Policy options which gained consensus as high or very high priority amongst participants (>60%).

	Policy option	% of participants (rating very high or high priority)	Groups median rating
1.	Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation (Option 9)	94%	**V. High**
2.	Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation (Option 4)	88%	**V. High**
3.	A compulsory national school package of policies and nutrition standards, to limit and restrict the provision and promotion of unhealthy foods (such as sugar-sweetened beverages, energy dense nutrient poor snacks) (Option 14)	92%	High
4.	Reduce taxes on healthy foods (for example, low or no sales tax, excise, value-added or import duties on fruit and vegetables) (Option 5)	87%	High
5.	Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship) (Option 29)	84%	High
6.	A compulsory national school package of policies and nutrition standards, to increase healthy choices, including a traffic light guideline system for canteen managers (Option 13)	84%	High
7.	Increase taxes or levies on unhealthy foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods) (Option 6).	82%	High
8.	Make food/nutrition education a stand-alone subject in schools, embed into other subjects of the national curriculum, and develop mandatory 'Core Food Competencies' for children to meet by the end of pre-school, primary and secondary school (Option 45).	77%	High
9.	Strengthen policies which restrict commercial influences on policy decisions related to food environments (Option 34).	76%	High
10.	Monitor the populations nutritional intake, nutritional status and other NCD risk factors (physical activity, smoking, alcohol consumption) every 5 years (Option 30).	76%	High
11.	Improve funding to research which targets improving food environments and reducing obesity. (Option 36).	74%	High
12.	Restrict unhealthy food marketing and sponsorship in sports events and venues (Option 8).	73%	High
13.	Provide a central health promotion agency for preventative health and a public health workforce to address nutrition-related health issues in Australia. (Option 35).	71%	High
14.	Restrict the sale of unhealthy foods in government-owned or funded public settings. (Option 16).	68%	High
15.	Provide government-subsidised healthy lunches and breakfast clubs in schools in vulnerable areas and communities (for example, Aboriginal and Torres Straight Islander communities, low income areas) (Option 15).	68%	High
16.	Strengthen visible political support for improving food environments by setting Australian targets, statements of intent from government and enhanced media coverage. (Option 32).	68%	High
17.	Restrict the promotion of unhealthy foods in government-owned or funded public settings. (Option 17).	66%	High
18.	Improve governments social marketing campaigns to promote dietary guidelines and a healthy weight (through TV, radio, news media, web-based, billboards, posters).(Option 44)	65%	High

19.	Clear, evidence-based dietary guidelines which provide standard serving sizes for food labels, and are informed by an expert scientific committee (Option 33).	63%	High
20.	Improve government to civil society collaboration to develop and implement food policies (includes collaboration with consumers, non-government organisations and public health professionals).(Option 39)	61%	High
21.	Introduce a Health Impact Assessment to be conducted on all government policies which prioritises them by their impact on population nutrition, health and reducing inequalities.(Option 42)	61%	High
**Ordered by median score, and level of consensus (Refer to Table S4; >60% low consensus, >70% moderate consensus, >80% high consensus).*			

Consumers were least likely to achieve consensus on priority (n=7; 13%), and policy makers most frequently gained 'high' consensus on the concept (n= 13;25%; practitioners n=5;9%, consumers n=3;6%). Policy makers were also more likely to converge on priority than practitioners and consumers (0.27; 0.07; 0.09).

6.3.5 Discussion

This study aimed to explore consensus on the perceived intrusiveness, effectiveness, impact on autonomy, and level of priority of obesity-related food policy options, from the perspective of consumers, practitioners and policy makers. The findings indicate good consensus between the groups on perceptions of all four concepts, for the majority of options, and suggest that most were considered nonintrusive, effective, and of little or positive impact to individual autonomy. The results suggest that the participants classification of policy options, by intrusiveness and impact on autonomy, did not agree with the classifications proposed by ethical frameworks for public health and the lobbying messages of commercial interests.

Group consensus

The key finding of a 'high' level of consensus across all three stakeholder groups is remarkable. Unexpectedly, stakeholders agreed on the classification of 94 to 98% of the options across the four different concepts. This provides support for the view that obesity policy decisions by government are difficult due to the divergent views of industry or academic perspectives with potentially vested interests (Cullerton et al., 2016[b], Crammond et al., 2013). Notably, highest level consensus was achieved on all four scales toward monitoring industry's compliance with government regulation, which was classified as a

nonintrusive, autonomy-neutral, effective, high priority policy option. However, had industry perspectives also been included, it is unlikely that such high level consensus would have been possible, given that industry is the target of this policy (Diepeveen et al., 2013).

Disagreement across the group was rare but was more profound toward interventions which bring about extensive environmental change (at the top of the Ladder), than those which do not (at the bottom of the Ladder), which could be due to differing individual views about the current environment. Personal beliefs about our capacity to make autonomous choices (Buchanan, 2013), and whether environmental change is essential to enable true choice of behaviour in the current environment (Mitchell et al., 2011), are individual and open to disagreement. Even where these beliefs align, political ideologies which shape attitudes about government interference may differ, leading to further diversity in responses to options that are classified at the top of the Ladder.

The consensus results bring forward the significance of transparency about the stakeholders that are being considered when assessing policy impact. Policies classified at the top of the Ladder, such as legislation, more commonly restrict industry stakeholders; hence a lack of distinction between the impact to *individual* and impact to *industry*, could contribute to disagreement on their intrusiveness. To harmonise perspectives and mobilise public support, it is important that the freedom of industry is well-defined from freedom of citizens (Griffiths & West, 2015), and the influence of the current environment on individuals capacity to make 'free' choice is clarified (Buchanan, 2013).

Perceived intrusiveness

An important finding was that perceptions of intrusiveness did not agree with the Ladder's classifications (Fig.6.2). Monitoring body mass index in schools and diet-related NCD risk at population level were two interventions which were considered 'slightly intrusive' by all three groups, but classified as less intrusive by the Ladder, and option N5 (added by participants in round one: *'…a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice'*) achieved consensus as the most intrusive option, despite its informative (theoretically non-intrusive) approach. Option 44 was similar to option N5 in recommending a social marketing campaign but was softly worded and rated as nonintrusive by participants. This suggests that the perceived intrusiveness of N5 may be

attributed to language and framing. Shock tactics, confrontational messaging and monitoring strategies have been successfully employed to address health-related behaviours (smoking and drink driving). However, public support for applying a similar approach to obesity is limited given the potentially regressive impact on vulnerable groups and other harmful outcomes, particularly the stigmatisation of obese individuals (Backholer et al., 2014). These three examples of policies considered intrusive by participants, suggest that perceived intrusiveness may be somewhat influenced by the risk of harm as well as the perceived restriction to choice.

The disparity between participants' and the Ladder's classification of policy intrusiveness is significant as incorrectly labelling a policy as intrusive constitutes an artificial barrier to implementation. Policies classified as highly intrusive have been deemed less acceptable (Diepeveen et al., 2013), and reliant on greater evidence of effect to justify implementation (Nuffield Council, 2007). Where individuals classify intrusiveness differently from the Ladder framework (Fig 6.2), support for these policies may be significantly underestimated (Diepeveen et al., 2013). This brings into question the relevance of the Ladder's classification, and suggests that consultation with underrepresented stakeholders about policies classified as intrusive by the Ladder is essential.

Significantly, the options which participants classified as somewhat intrusive were *not* considered by them to reduce their autonomy. This finding contrasts with negative discourse around intrusive intervention (Jochelson, 2006, Magnusson, 2015) and suggests that, in the context of food policy, intrusive policy actions may at worst have no impact to autonomy, and at best enhance it (Griffiths & West, 2015). It also aligns with the viewpoint that intervention is required to rebalance the environment to enable truly autonomous decisions, and supports the Balanced Ladder (Buchanan, 2013, Griffiths & West, 2015, Mitchell et al, 2011). Furthermore, it offers support for the view that policy options which simultaneously enhance health and autonomy should not require 'special justification' for implementation. Whilst framing and evidence are barriers to progress (Clarke et al., 2016, Cullerton et al., 2016[a], reframing policies by impact on autonomy, rather than intrusiveness, could mobilise public support and encourage the adoption of policies which improve capacity to make autonomous choices.

Evidence, effectiveness & priority options

The finding that most options were perceived to be effective, and that those considered mostly effective (Box 6.2) were also considered high priority (Box 6.3) negates the concern around implementation without evidence (Brownson et al., 2009, Crammond et al., 2013, Cullerton et al., 2016[a], Lang & Rayner, 2007, Nuffield Council, 2007). Despite debate around the importance of evidence for policy adoption (Clarke et al., 2016), 'best possible' evidence is still considered a prerequisite for prioritisation. Our results refute this, and suggest stakeholders are less concerned about evidence for effectiveness and more concerned about challenging the status quo. Where perceived effectiveness is found to influence acceptability (Petrescu et al., 2016) and acceptability increases with time (Diepeveen et al., 2013), it has been suggested that a 'leap of faith' (Faulkner et al., 2011) using 'best available' evidence' (Muir Gray, 1997) is required to generate 'practice-based evidence' (Green, 2006). Governments should acknowledge the equivocality of evidence of effectiveness as a prerequisite for implementation, and take more notice of the perspectives of underrepresented stakeholders to balance the domineering positions which emphasise a need for 'best possible' evidence (Mialon et al., 2017, Stuckler et al., 2016).

There was clear support toward government regulation across all stakeholders in the current study. Regulations which target industry are amongst the strategies most heavily opposed by commercial lobbyists, who also emphasise the lack of evidence, or ineffectiveness of regulation (Bødker et al., 2015, Corvalán et al., 2013, Stuckler et al., 2016). However, our results clearly show that when vested interest views are excluded, there is high level consensus that regulations which target industry would be 'very effective', and are considered 'very high priority', 'nonintrusive' and of 'no impact on autonomy'. These regulations have also been prioritised by obesity prevention experts (Swinburn et al., 2015) and align with priorities of informed public health experts in Australia, England and New Zealand (The Food Foundation, 2016, Sacks et al., 2017, Swinburn et al., 2014), Australian consumers (VicHealth, 2016) and a range of stakeholders across Europe (Lobstein & Millstone, 2006). Despite regular advocacy campaigns and calls to action (Obesity Policy Coalition, 2013, Mitchell, 2017), the Australian government is yet to draw upon legislative powers to regulate advertising to children, which demonstrates the power of industry stakeholders in influencing policy. The current findings provide support to government to implement policies which are not favoured by industry but are acceptable to all other

stakeholders, and importantly lessen the ethical and evidential barriers to industry-targeted regulation. The value of bringing forward underrepresented views to balance debate (Mialon et al., 2017), particularly where the objectives of industry differ from those of public health advocates and consumers, is supported.

Finally, consensus was achieved regarding the level of priority for 49 policy options. Notably, most of the higher priority options of the stakeholders in this study have also been prioritised by public health experts in Australia, in research which included academics, but not industry (Sacks et a., 2017). This alignment of priorities enhances the credibility of the methods used for identifying relevant priorities across stakeholder groups. The feasibility of engaging consumers, alongside policy makers and health practitioners in public health policy decisions has been demonstrated, and aligns the policy-Delphi method with the global movement to involve consumers in decisions affecting their health (Boivin et al.,2014, Cowen & Oliver, 2013, Huang et al.,2015, Oliver et al., 2004, Oliver et al., 2014, Wilson et al., 2004).

6.3.6 Strengths and limitations

This study represents a novel attempt to exclude industry and academic perspectives in order to rebalance the debate and bring forward the views of stakeholders commonly underrepresented in obesity policy research and decisions. A planned face to face workshop was not feasible (Haynes et al., 2016), however the online design addressed common limitations to face-to-face methods, such as dominant views, the logistics of recruiting participants across a large geographical area, and reduced the risk of conflict stifling individual perspectives across potentially political and emotive concepts. Iterative rounds provided opportunity for reflection with others, independent of vested interests, which enhanced conditions for genuine ratings and a deeper insight into the views of these stakeholders.

A possible limitation is that the survey included obesity-related food policy options only; these options were prioritised based on the urgent need for effective food policy (GLOPAN, 2016, Swinburn et al., 2015), and was an amendment to protocol that ensured that the survey presented a feasible number of homogenous options for rating. Policies which aim to address physical inactivity are essential for a comprehensive obesity strategy (Taskforce, 2009,

WHO, 2016a) and therefore a future investigation into policy options which target physical activity behaviours is recommended.

Participants sampled were likely to have been individuals with a particular interest in this area, and socio-economic biases were not monitored or accounted for in the sampling method. However, such participants provide an information rich sample which is considered appropriate to address the research question and design. Men were poorly represented, and given that gender is associated with level of support for health-related policy interventions (Diepeveen et al.,2013), this was a limitation which emphasises the importance of actively seeking the views of male stakeholders.

6.3.7 Implications for obesity policy in Australia

This study provides a valuable contribution to the growing literature around stakeholder involvement methods for priority setting, and positions the policy-Delphi as a useful tool for where evidence is lacking and dominant stakeholders are polarised. Bringing forward the perspective of underrepresented stakeholders has dispelled misconceptions which are barriers to policy, and underlines the value of actively seeking these views to accelerate progress. Government should be confident that the majority of food policy options are largely acceptable amongst these groups, across four ethical and evidential considerations to obesity policy implementation. Reframing options through autonomy, and ensuring a clear distinction between impact to *individuals* and *industry*, has the potential to improve public support and political will for effective government action against obesity.

CHAPTER 7: PERCEPTIONS OF POLICY INTRUSIVENESS AND IMPACT ON AUTONOMY

7.1 Preamble

This chapter presents the qualitative analysis of comments made to the policy Delphi presented in Chapter 6. The following manuscript entitled '*Perceptions of policy intrusiveness and impact on autonomy: Considerations for obesity-related policy in Australia'* is under review at *BMC Public Health*'.

7.2 Abstract

The concept of policy 'intrusiveness' has been employed by lobbyists to frame and derail public health policies for effective obesity prevention. Conflicting priorities and diverse perspectives, encompassing paternalistic and libertarian views toward government interference, have hindered the implementation of polices to protect public health. Public and political will are essential for progress to be made. This study aimed to explore stakeholder perceptions of policy intrusiveness and impact on autonomy from the perspective of those commonly underrepresented in policy decisions. A purposive sample of Australian consumers, public health practitioners and policy makers, took part in a in a three-round policy Delphi survey, to rate the intrusiveness and impact on autonomy of 53 obesity-related food policy options. Sixty-four individuals rated the options and good consensus was achieved across the groups. Participants were then invited to contribute text comments to justify their ratings for each item. Sixty-three percent of participants contributed to the data and directed content analysis was conducted. The findings indicate the role of change, benefit, consequence and preferred behaviour as potential contributors to perceptions of policy intrusiveness and impact on autonomy. Furthermore, the dimension through which policy impact is evaluated (i.e. to self or other, to liberty or to health) further influences perception. The study validates the policy-Delphi as an appropriate method to explore diverse stakeholder perspectives on complex concepts. The findings emphasise the importance of reframing policy intrusiveness, by clarifying the distinction between perceived impact to *individual* and *industry* autonomy, to encourage policy adoption.

7.3 Introduction

Nearly two-thirds of adults and a quarter of children in Australia are overweight or obese. Government leadership has been highlighted as crucial to reverse the rising prevalence (Chan, 2013, WHO 2013) given the burden of obesity at individual and population level (Ng et al., 2013, AIHW, 2011). However, leadership on obesity-related policy, from national, state and local governments remains inadequate (Mitchell, 2017).

Evidence has been proposed as a prerequisite to policy action, particularly for those options which are considered 'intrusive' to individual choice (Nuffield Council 2007). According to a foundational ethical framework, (Nuffield Council 2007) a large number of food-related policy options are considered intrusive; however, prospectively researching the effectiveness of these population-wide policies is often difficult, (Crammond et al., 2013, Mayne et al., 2015, Oliver et al., 2014) and consequently a lack of evidence is a barrier to policy adoption (Crammond et al., 2013). Despite this, government decisions are unavoidable (Thaler & Sunstein, 2003) and governments remain accountable for improving population health whilst reducing health inequalities (Nuffield Council, 2007, Swinburn et al., 2015). Given their predicted benefit to public health, (Cullerton et al., 2016[a]) polices which regulate food environments may need to be implemented in accordance with 'best available', rather than 'best possible' evidence, where the latter is impractical (Muir Gray, 1997, Swinburn et al., 2005).

Research has identified other barriers and enablers to policy which improve food environments at national (Clarke et al., 2016, Cullerton et al., 2016[a]) and global level (Phulkard et al., 2016). The integral role of public support and political will in advancing progress, and the powerful role of industry in influencing these stakeholders has been confirmed (Chan, 2013, Clarke et al., 2016, Cullerton et al., 2016[a], Cullerton et al., 2016[b], Nestle, 2013, Mialon et al., 2017). The advocacy position of commercial interests explicitly supports an individual responsibility approach to obesity prevention (Elliot-Green et al., 2016, Niederdeppe et al., 2013), and positions government-led regulation to protect public health as inherently intrusive to individual freedom through the analogy of a 'nanny state' (Magnusson, 2015). These tactics align with the Nuffield Council of Bioethics definition of 'intrusiveness', which assumes that any intervention imparts a cost to liberty and intrudes on individual choice (Nuffield Council, 2007). In contrast, public health experts suggest that

environmental policies at systems level is the only way to bring about meaningful change to reduce obesity (Swinburn et al., 2015), and public perceptions of intrusion and autonomy, in the context of food-related, obesity prevention policy remain underexplored (Diepeveen et al., 2013). Given the policy relevance of public acceptability (Diepeveen et al., 2013, Swinburn et al., 2005), and that framing and messaging are important for policy adoption, (Clarke et al., 2016, Cullerton et al., 2016[a], Juntti et al., 2009, Roberto et al., 2015) it is essential to understand how government policy to change the food environment is interpreted from a societal perspective, in isolation from industry influence and other vested interests.

Aim

This study explored how policy makers, public health practitioners and consumers rate policy options for intrusiveness and impact to autonomy. The aim of this analysis was to identify potential contributors to individual perceptions of these concepts, to understand the reasons for differing perspectives and conflict with group consensus.

7.4 Method

Theory

The Nuffield Ladder of Intervention (the Ladder) is a key reference in public health ethics, and suggests that public health interventions can be classified linearly by their degree of 'intrusiveness' to individual choice (Nuffield Council, 2007). The concept is underpinned by the 'harm principle' (Mill, 1859) and assumes that any intervention imposes a cost to liberty and intrudes on individual choice, and consequently, those of greater 'intrusiveness' require greater evidence of effectiveness to justify implementation. Despite the Ladders' value in considering public health ethics, its hierarchal design and underpinning assumption has been subject to criticism. Griffiths and West (2015), for example, propose a rearrangement of the Ladders' 'rungs', ordered by impact on individual autonomy, and present an alternative 'Balanced Ladder' whereby interventions of varying levels of intrusiveness may either enhance or diminish autonomy (Chapter 1; Table 1.2). Their alternative challenges Nuffield's perception of liberty, justice, autonomy and intrusion; the need for essentially 'unobtainable evidence' to support regulatory interventions; and provides the theoretical underpinning for this study.

Recruitment

Consumers, public health practitioners and policymakers, without food industry affiliations, were invited to participate via an email circulated across government, non-government organisations and consumer engagement networks. Potential participants were asked to forward the study details to other potentially eligible individuals to enable further 'snowballing' recruitment. Eligibility was assessed prior to enrolment against predefined inclusion criteria, (Haynes et al., 2016) to obtain a purposive sample to represent each of the three stakeholder groups equally, and to attempt to gain responses across each of the five states and territories in Australia. Ethical approval was granted by the Bond University Human Research Ethics Committee. Informed consent was implied by providing personal details following acknowledgement of the online Participant Information and Consent Form.

Data collection

A 45-item list of obesity-related, food policy options was informed by the Food-EPI tool; a high-quality tool (Phulkard et al., 2016) relevant to national food policy options (Vandevijvere et al., 2014). The list was developed to ensure that policy options represented all levels of the Ladder and Balanced Ladder frameworks. The options were imported to Qualtrics (an online survey platform), and presented as questions requiring a rating for effectiveness, intrusiveness, impact to autonomy and level of priority of each option across four 5-point Likert scales. Participants were provided with a unique identification number and link to the survey, and asked to independently participate in three consecutive rating rounds over a period of 12 weeks. The process provided an opportunity for each participant to contribute additional options (round 1), and to view the median rating from the full group (rounds 2 and 3). The quantitative findings are detailed elsewhere (Haynes et al, under review: *Chapter 6*). The three stakeholder groups achieved good consensus on the intrusiveness and impact to autonomy of the policy options, when isolated from industry and academics; however, their classifications contrasted with those of the Ladder and the Balanced Ladder. Participants considered the majority of policy options to be nonintrusive and of little or positive impact to individual autonomy (Haynes et al, under review: *Chapter 6*).

In the final, third round each participant was then invited to provide reasons for their ratings. Free text comments were allowed for all options to gain insight particularly into those options with a diverse response (O'Loughlin & Kelly, 2004). Free text comments, rather than an interview or focus group, was chosen as the most pragmatic method for all participants to have an opportunity to contribute with a minimum of participant burden. Sixty-three percent of participants (n=39) provided comments and these were analysed for this study.

Data Analysis

Survey comments were extracted in text format for directed content analysis (Hsieh et al., 2005). An abductive approach was used, whereby comments were deductively applied to the concepts of intrusiveness and autonomy as implied by the text and then coded inductively and constantly compared (Hsieh et al., 2005, Timmermans & Tavory, 2012).

Specifically, comments were first indexed according to the policy option, and then labelled with their stakeholder group and the participant's ratings against each scale. The comments were read multiple times to allow immersion in the data. Two researchers then independently identified terms and words which were frequently referenced to inform initial codes. The data was interpreted within the context of perceived intrusiveness and impact on autonomy, and comments were analysed separately according to how the participant rated the policy option under discussion (i.e. Intrusive or nonintrusive, enhances autonomy or reduces autonomy), and whether their rating contradicted group consensus. Similar codes were collapsed and further condensed into categories. The codes and quotes were re-examined and compared to assist interpretation and development of overall categories. Interactions between the categories were noted to inform the development of a model to represent the connection between categories.

7.5 Results

The response to the invitation to provide additional comments was greatest amongst consumers but similar across the three groups (Table 7.1).

Table 7.1: Details of participants and representation across stakeholder groups.

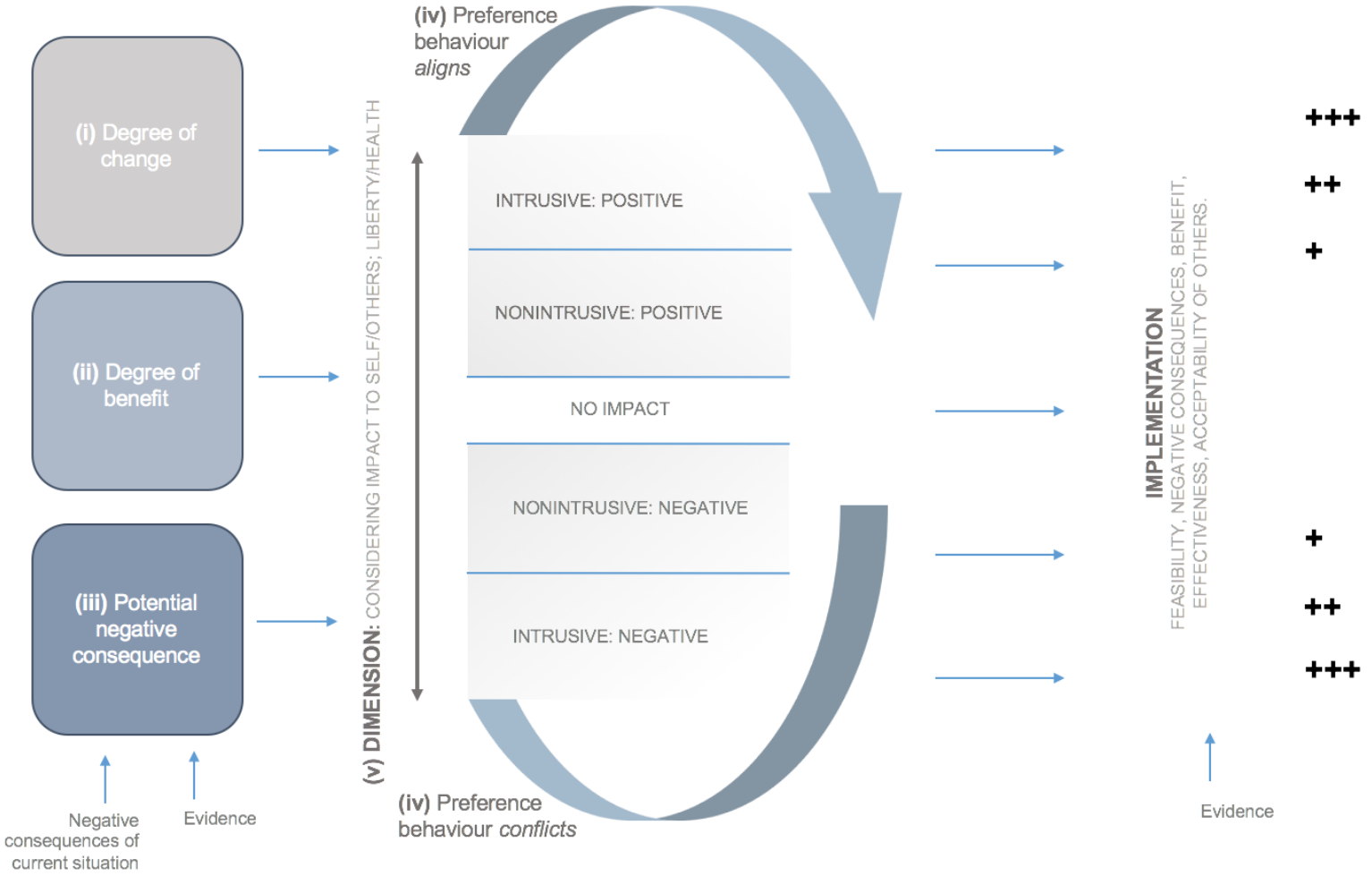
	Total (n=39)	Consumer (n=14)	Practitioner (n=12)	Policy maker (n=13)
Age (years)				
Mean ± SD	48 ± 14	54 ± 14	42 ± 12	47 ± 12
Gender (n;%*)				
Male	4 (10)	2 (14)	1 (8)	1 (8)
Female	35 (90)	12 (86)	11 (92)	12 (92)
State (n;%*)				
Victoria	9 (23)	6 (43)	2 (17)	1 (8)
Queensland	13 (33)	5 (36)	2 (17)	6 (46)
New South Wales	9 (23)	1 (7)	5 (42)	3 (23)
Tasmania	4 (10)	0 (0)	2 (17)	2 (15)
Northern Territory	1 (3)	1 (7)	0 (0)	0 (0)
South Australia	1 (8)	0 (0)	1 (8)	0 (0)
Western Australia	1 (3)	0 (0)	0 (0)	1 (8)
Australian Capital Territory	1 (3)	1 (7)	0 (0)	0 (0)

**% of total number of participants in stakeholder group.*

Categories

Five key categories were identified from the data which suggest that the role of (i) change, (ii) benefit, (iii) consequence, and (iv) ones' preferred behaviour contribute to individual perception of intrusion and autonomy for three under-represented stakeholders in obesity policy. Additionally, (v) the dimension through which impact is quantified (e.g. to self or to others; to liberty or to health) may further contribute to how these stakeholders perceive policy options in relation to their intrusiveness and impact on autonomy (Barnhill et al., 2013). Exemplar quotes to support the five categories is presented below and in Table A7.1 (Appendix 7). Figure 7.1 portrays the interrelationship between categories and sub-categories.

Fig 7.1: *Theoretical model to illustrate the interrelationship between the categories identified by the qualitative analysis.*



The findings generally do not support Nuffield's non-interference conception of autonomy, and rather support Griffiths' interpretation, that government intervention is actually required to allow individuals to self-rule. The findings further challenge the Balanced Ladder in suggesting that preference behaviour cannot be predicted, and therefore the classification of policy options as intrusive or impacting autonomy is contextual and transient.

Contributors to perception of intrusiveness and autonomy

Participants frequently expressed the notion that the degree of change to individual lives shaped their perception of intrusiveness, and policy options were more likely to be interpreted as intrusive where one anticipated a noticeable change to the 'norm' (Fig.7.1 (i)).

'That would be every shelf in a supermarket!' (Consumer C101 on option 25: "In retail stores, reduce the proportion of space dedicated to unhealthy foods (for example, less than 10% of space allocated for confectionary and sugar-sweetened beverages"; Ratings*: Intrusive, no impact on autonomy)*

This aligns with the Nuffield concept of intrusiveness; whereby any government intervention, above doing nothing, imposes a degree of intrusion to individuals' lives (Nuffield Council, 2007).
Participants did not necessarily perceive intrusion as positive or negative, and this was not necessarily related to the degree of change.

'...I think this would make a huge positive difference to my life therefore I rated as highly intrusive – i.e. intrusive in a positive way. It would make my work much less complicated and much easier to achieve.' (Policymaker P103 on option 34: "Strengthen policies which restrict commercial influences on policy decisions related to food environments"; Ratings: *Highly intrusive, greatly increases autonomy).*

Previous research has shown intrusive interventions to incite less public support than nonintrusive options (Diepeveen et al., 2013), which can be attributed to societal preference for libertarian, above paternalistic, approaches to government intervention (Barnhill et al., 2013). The data presented here suggests that level of 'intrusion' as defined by the Nuffield framework, may not impact on the acceptability of the option even where it is perceived as intrusive.

'…Limits choices so is intrusive, but the change is in a healthy direction consistent with the choices I wish to make.' (Policy maker P201 on option 14: "A compulsory national school package of policies and nutrition standards, to **limit** and **restrict** the provision and promotion of unhealthy foods"; Ratings: *Intrusive, Greatly increases autonomy).*

The alignment between what one prefers to do (ones' 'preference behaviour' (Hawkes et al., 2015)), and the objective of the intervention may have a greater impact on whether the intervention is interpreted in a positive or negative way, independent of perceived intrusiveness (Fig.7.1 (v)). The alignment was indicated across all stakeholder groups, but was particularly strong amongst policy makers who frequently highlighted a distinction between intrusiveness and positive or negative views. This aligns with Griffiths' model of autonomy; where an individual's preference choice aligns with the proposed policy it follows that autonomy is increased, and where the individual's preference choice conflicts with the policy, autonomy is reduced. It also suggests that public health intervention is required to effectively 'self-rule' and thus government intervention can support one's capacity to do so (Griffiths & West, 2015).

The data suggests a transient nature of preference behaviour at any given moment, and the extent of potential influencers on preference behaviour (Hawkes et al., 2015) further complicates the issue. Here a degree of change to a specific experience is acknowledged:

'…I feel that this would be somewhat intrusive, because often sporting events are social and celebratory occasions. Although not ideal, unhealthy foods and drinks are part of the experience. If restricting marketing and sponsorship meant also restricting the sale of these products I think it would affect the experience.' (Practitioner H122 on option 8: "Restrict unhealthy food marketing and sponsorship in sports events and venues"; Ratings: *Slightly intrusive, slightly reduces autonomy).*

This highlights a limitation of the Balanced Ladder framework, which classifies impact on autonomy, but assumes preference behaviour. The findings suggest that preference varies not only between individuals, but within individuals depending on context, such as setting, time, or occasion (at work, home, the football). This provides an opportunity to understand those contexts where policy action to change food-environments is perceived negatively; which may facilitate tailored public health interventions and highlight a need for relevant advocacy

campaigns toward specific settings and the individuals who commonly make decisions within them. This approach has been employed by other public health campaigns whereby incremental exposure, lead to interventions becoming more acceptable (Diepeveen et al., 2013).

The positive connotations associated with intrusive intervention presented by the three stakeholder groups may be explained by the concept of libertarian paternalism (Thaler & Sunstein, 2003). Thaler and others suggest that government decisions are inevitable, hence a degree of paternalism is unavoidable; the necessary decision to amend, withdraw, implement or refute policy, demonstrates that government decisions determine the healthiness of the food environment (Barnhill et al., 2013, Buchanan, 2013). However, when the decision made appears particularly 'natural' and 'obvious' paternalism may not be recognised (Thaler & Sunstein, 2003). This theory was supported by the data:

'…Very nonintrusive for me personally as happy to have the healthy choice the only and default choice available.' (Practitioner H114 on option 28: "Regulate food promotion so that only healthy choices can be promoted in food service outlets."; Ratings: *Very nonintrusive, no impact to autonomy*).

'…It would impact my autonomy, since there are times I feel like a "less healthy" choice and would base my decision off a promotion or menu board.' (Practitioner H122 on option 28: "Regulate food promotion so that only healthy choices can be promoted in food service outlets."; Ratings: *Slightly intrusive, slightly reduce autonomy).*

When preference behaviour aligned with the policy objective, the change may be more discreet, than in a context where preference behaviour conflicts and change is perceived as more apparent, paternalistic, and perhaps more intrusive. The conflicting perspectives presented above may be attributed to how the policy would impact on autonomy given the difference in preference behaviour. However, the difference in perceived intrusiveness between the two suggests that ones' definition of intrusion may be distorted by consideration of the impact on individual autonomy.

A number of industry targeted regulations were considered intrusive by participants, and some explicitly acknowledged the recipient of the intrusion.

'…I gave it 'intrusive' because it is to the companies. However, I see it as essential that restrictions must be applied - hence very high priority…' (Policymaker P107 on option 29: *"*Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship)." Ratings: *Intrusive, no impact on autonomy).*

The data confirms that intrusiveness may be quantified from the perspective of industry and therefore the degree of change to industry may have influenced the policymakers' perception of intrusiveness to individuals (Fig 6.4. (iv)). Where food advertising regulation does not directly restrict individual's choice, but does restrict industry, a lack of distinction between intrusiveness to industry versus to individuals, may enhance public resistance toward industry targeted regulation. This in turn could hinder progress toward healthier food environments (Huang et al., 2015).

It is important to note that perceptions of intrusiveness, via the degree of change, may also be shaped by one's framing of obesity as an individual or systemic issue. Despite efforts to harmonise this dichotomy and emphasise the importance of simultaneous intervention at individual and systems level, polarised views remain prevalent (Roberto et al., 2015). The individual responsibility approach continues to be strongly promoted by industry (Mialon et al., 2017). The views of those who perceive obesity as an individual responsibility, may align with those of commercial interests, and be less tolerant to population level change. A systems approach would benefit other public health issues, whilst addressing specific obesity related objectives, and this should be emphasised to improve tolerance to change, perceptions of intrusion and enhance policy adoption (Clarke et al., 2016, Swinburn, 2008).

Benefit versus consequence

Participants referred to the likely benefit of policy outcomes to themselves or others; particularly amongst options perceived to be nonintrusive (Fig.7.1 (ii)).

'…It would be fantastic to have access to healthy food at every sport event I went to.' (Practitioner H105 on option 8: "Restrict unhealthy food marketing and sponsorship in sports events and venues"; Rating: *Nonintrusive, slightly increases).*

Participants reported that the benefits were considered in isolation, or in conjunction with negative perceptions of the status quo. Where the current environment was deemed harmful, unbalanced or favouring unhealthy choices, the policy options were discussed with regard to the improvement they could bring to the current situation; consequently, these were perceived to have little or a positive impact on autonomy.

'…Very needed where people don't "own" choices and consequences'. (Consumer C107 on option 6: "**Increase** taxes or levies on **unhealthy** foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods)"; Ratings: *Nonintrusive, no impact to autonomy).*

The acknowledgement of benefit generally occurred with a nonintrusive rating; however, in some cases, the perceived benefit assigned positivity even where a policy was rated as a more intrusive action.

'…Slightly intrusive as it would change the environment I live in....but intrusion is not a default negative. In this case the slight intrusion would increase my autonomy by not being subconsciously influenced by advertising (even though targeted at children, the wider community is still exposed). (Policy maker P114 on option 4: "Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media through legislation"; Ratings: *Slightly intrusive, greatly increases autonomy, high priority).*

Individual perceptions on the adequacy of the current environment may influence how 'obvious' or 'natural' a decision is perceived to be (Thaler & Sunstein, 2003), and how acceptable the resultant policy is (Diepeveen et al., 2013). By acknowledging the potential harm of the current obesogenic environment, at individual and population level, the benefit of intervening may be more 'obvious', and therefore interpreted as less paternalistic (Thaler & Sunstein, 2003). This may explain why contributions which considered the current situation were generally perceived as nonintrusive. However, attitudes regarding the current environment, and thus potential benefit of intervention, are shaped by lived experience (Diepeveen et al., 2013) and as the latter is individual, it gives rise to diverse perceptions of intrusion and impact on autonomy, through the association depicted by Fig.7.1.

A number of participants expressed concern over the potentially negative consequences of policy, particularly on vulnerable populations. Typically, where these considerations were expressed, the option was classified as intrusive (Fig 7.1 (iii)).

'...If anything a shock campaign will increase stigma against obese people, people with chronic diseases related to diets and potentially further isolate and worsen situations for marginalised groups. Unless ALL people are aware of and can access and afford healthy choices, it is unfair to promote fear and shock around unhealthy "choice", (if you can call it a choice.)'. (Consumer C117 on option N5: "Government to lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice"; Ratings: *Highly intrusive, slightly reduces*).

The recognition of potential consequences may explain why some educational strategies are perceived to be intrusive, despite a lack of direct restriction to choice and their less intrusive position on the Ladder. The concern about vulnerable groups raises fear of 'regressive' and 'unfair' policy options which could be interpreted as stigmatising, or considered to exacerbate social inequalities (Barnhill et al., 2013, Buchanan, 2013, Giles et al., 2016). The harmful consequences of restricting individual choice are important ethical considerations, (Childress et al., 2002, Kass, 2001) however, the dimension through which impact is assessed is important (Barnhill et al., 2013). The consequence on liberty, and the consequence on health or social inequality should be considered independently, and then in the context of harm inherent in the current situation. As obesity itself is regressive, unfair distribution of intrusion may be preferable to unfair distribution of health (Barnhill et al., 2013). As perceptions of harm may shape attitudes towards intervention (Diepeveen et al., 2015), it is essential that public health advocacy emphasises the harmfulness of the current environment, and the effectiveness of policies to reduce harm (Floyd et al., 2000).

A key example of the position of benefit and consequence proposed in this study, is the response to the policy option 31 ('*Monitoring children's BMI annually using school measurement programmes...*'). This was considered an intrusive intervention *(Chapter 6)* even though it would be classified as less intrusive according to the Ladder. Participant comments on this option suggest that the high rating for intrusiveness, and lack of support toward implementation, may be attributed to potential negative consequences, specifically stigmatisation and potentially harmful effect on eating behaviour.

'...I am not clear what the benefit would be of collecting this information. All efforts should be made to reduce obesity stigma and body self-consciousness about weight. Better to focus

on promoting, encouraging and rewarding behaviours that promote a healthy weight and positive body image. Humans come in all shapes and sizes.' (Practitioner H115 on option 31; Ratings: *Highly intrusive, No impact on autonomy, Very low priority)*

These participants acknowledge the potentially harmful consequences, and perceive the option as highly intrusive and very low priority. However, when the option is considered in the context of potential benefit to the current situation, their perception of intrusiveness and priority may be different.

'…Although intrusive, we do need some form of monitoring so we can ensure the issue remains a priority.' (Practitioner H114 on option 31; Ratings: *Slightly intrusive, No impact on autonomy, High priority).*

This suggests that options perceived to convey a greater degree of benefit may be more likely to be rated as nonintrusive, or may also justify implementation even where the option is considered to be intrusive.
Those who considered this monitoring option as least intrusive generally acknowledged a difference between the impact to themselves, and those targeted by the intervention.

'…would be intrusive to schools and children measured but not to me.' (Policy maker P201 on option 31; Ratings: *Nonintrusive, No impact on autonomy, Somewhat priority).*

This finding emphasises that perceptions of intrusiveness may vary depending on who the intrusion, or the potential consequences are being quantified for (for example, children (above), or industry (below) (Fig 7.1. (v)).

'…Not convinced private companies will be responsive to this approach (profit driven after all)' (Consumer C201 on option 20: "Provide resources and training for **private** companies, to promote healthy food provision in the setting"; Ratings: *Slightly intrusive, no impact on autonomy, somewhat priority).*

Nuffield's framework indicates that any potential for harm should prohibit implementation unless there is good evidence of effect (Mill, 1859, Nuffield Council, 2007), and even where the impact to oneself is negligible, the harm to other groups should be considered to avoid social inequality (Backholer et al., 2014). However, where the negative consequences are only to commercial gains, such frameworks may hinder the application of potentially

effective strategies. Several factors shape individuals' perceived risk of harm, including the media. There is evidence that industry seeks to influence the medias' portrayal of obesity policy, (Mialon et al., 2017) and by blurring the harm to individuals with harm to commercial gains, may indirectly shape perceptions of intrusion through public interpretation of negative consequence. The findings suggest that it is important to clarify the harms or benefits to individuals and industry independently and make such a distinction transparent to inform policy debate.

Implementation considerations

During analysis, a number of codes were noted to be potentially important considerations for obesity policy implementation, rather than contributors to perception (Fig.7.1; Appendix: Table A7.1). The evidence of potential benefits and consequences, in the context of policy application was referenced, alongside policy feasibility and acceptability as recognised by existing obesity policy frameworks (Swinburn et al., 2005, Giles et al., 2016). The feasibility of the option was considered important, particularly when commenting on a policy with an intrusive rating. In addition, the policy impact to commercial parties and subsequent lack of acceptability from industry, were also expressed as a concern, and these usually occurred when commenting on an intrusive rating.

'Low priority because this would never get over the line with food industry influence. It would be a waste of time trying.' (Policy maker P117 on option 26; "Regulate the amount of saturated fat, sugar and salt in a standard serve of food and drink sold at all food service outlets through legislation"; Ratings: *Highly intrusive, slightly reduces, low priority).*

Participants also referred to effectiveness as a consideration to implementation, and frequently referred to evidence in this context.

'No evidence these actions are effective and would only apply prospectively.' (Policymaker P201 on option 21; "Introduce planning acts, which prevent hot food takeaways trading within 400m of schools and other key public settings (such as hospitals, sports/leisure centres)"; Ratings: *Slightly intrusive, slightly increases autonomy, very low priority).*

The need for evidence to substantiate a policy before implementation by governments, is emphasised by the Nuffield framework. In the context of population wide public health strategies, it is well accepted that evidence for effectiveness using methods such as randomised controlled trials is rarely feasible and there is a need for pragmatic trial designs (Crammond et al., 2013, Mayne et al., 2015, Oliver et al., 2014, Yoong et al., 2014). The importance of evidence for effectiveness in influencing policy adoption has also been questioned (Clarke et al., 2016). In light of these considerations, the mobilisation of public support for obesity policy adoption is important (Huang et al., 2015). Support may be generated by reframing outcomes through the impact of policy on wider health and social benefits, (Lobstein et al., 2006) and encouraging media advocacy around the harmful impact of the current situation to individuals and aggregate health (Huang et al., 2015). These strategies hold the potential to provide justification for implementation within consumer, policy maker and practitioner stakeholder groups, as depicted in Figure 7.1.

Although a number of implementation barriers can be addressed by prioritising aggregate health over commercial gains, it remains essential to consider harm in the context of implementation. Health interventions should be assessed for their potential to exacerbate health inequalities (Acheson, 1998) and produce unintended consequences (Fox & Horowitz, 2013). These are important considerations when applying population wide strategies, and therefore, tools to identify policy impact across the socio-economic gradient are essential (Backholer et al., 2014). These findings demonstrate that this is recognised across stakeholder groups, and verifies negative consequences as an important consideration to policy implementation.

7.6 Strengths and limitations

This is the first study to use the policy-Delphi technique to exclude industry and academic perspectives, and effectively bring forward the views of those stakeholders commonly underrepresented in obesity policy research and decision-making.

The online design avoided common limitations to face-to-face methods, such as dominant views, conflict in discussing emotive ethical concepts and logistics of recruiting participants across a large geographical area. Further, iterative rounds provided opportunity for reflection

with others, independent of vested interests, which may have contributed a more accurate and deeper insight into the perception of these stakeholders.

In recruiting participants, we are likely to have sampled interested individuals, and socio-economic biases were not monitored or accounted for in the sampling method. However, for the qualitative investigation these types of participants provide an information rich sample and therefore were appropriate. Men were poorly represented and where gender is associated with level of support for health-related policy interventions (Diepeveen et al., 2013) this was considered a limitation. Given this common limitation to obesity-related qualitative research, (Brown & Gould, 2013) it is important that future research actively seeks the views of male stakeholders.

Finally, the triangulation in data analysis enhanced the credibility and confirmability of the findings, and the application of qualitative analysis provided depth to the interpretation of quantitative findings, through a deeper understanding of viewpoint (Ritchie et al., 2010, von der Gracht, 2012).

7.7 Conclusion

The findings suggest that public health efforts should clearly distinguish policy impacts on *individual* and *industry* autonomy to counter the power of corporate political activity strategies. Further, transparency about the negative impact of the current environment on aggregate health, across the socio-economic gradient, may improve non-industry stakeholder understanding of the likely impact of policy to individual 'freedom'. The perceptions of consumers, policy makers and public health practitioners do not align with Nuffield's non-interference conception of autonomy in the context of obesity-related food policy, and instead support Griffiths balanced definition which acknowledges the potential harm of the current environment.

Although the concepts presented are just one consideration for governments amongst a plethora of criteria; they are important tools for policy adoption, and acceptability. Given the power of industry messaging, the influence of framing on policy adoption, and the importance of public support for effective policy implementation, efforts which encourage better understanding of policy impact on individual autonomy and wider public health, may

lead to action through public and political will. It is essential that the views of under-represented stakeholders are more explicitly sought, and that their perceptions of the concepts of intrusion and autonomy are overtly considered when evaluating policy options.

This investigation of stakeholder perspectives contributes to the growing pool of alternative evidence available to accelerate obesity-related policy adoption. There are two key implications to these findings. The first is that there is utility in using the framework to change community views around intrusion and autonomy. Reframing policy options through the impact to individual autonomy as opposed to intrusiveness or impact to those with vested interests, makes policy more relatable to individuals, and encourages them to prioritise food-related policy options via the true impact to their lives. Secondly, governments should consider the impact of policy according to the position of stakeholders by actively seeking voice from underrepresented groups; particularly where there is good consensus amongst consumer, health practitioners and policy makers' views, in order to strengthen public advocacy for obesity policy adoption.

7.8 Amendments to protocol

Prior to implementation, the study protocol was reviewed to firstly produce a more homogeneous sample of options, and secondly minimise time and financial burden on research participants. These were considered essential to the success of the study with regard to participation, retention of participants and meaningful analysis.

To enable a comprehensive and reliable analysis of the concepts under investigation, the survey must encompass policy options which exemplify each level of the theoretical framework, and account for each setting, target behaviour and target population; thus a large number of options were required. To ensure study outcomes were of maximum value, the survey was reviewed to include obesity-related food policy options and exclude those relating to physical activity.

Several reasons contributed to this decision. Whilst nutrition-related chronic disease is the leading risk of premature mortality globally and obesity prevalence continues to rise in all countries (Ng et al., 2013) it is essential to prioritise research into obesity-related food policy. Despite this urgency, food policy is the primary target for industry lobbying and a greater

proportion of objection and resistance to policy change has been directed toward food related government regulation than policy proposals to improve physical activity. In particular, 'nanny-state' objections are regularly mediatised in the context of food law and regulation, and where 'Big Food' dominates public discourse around regulation, with direct reference to libertarian and paternalistic concepts, then protecting public and political will from such is justifiably a priority. Furthermore, food policy change which encourages healthy diet is now considered a global priority and the World Health Organisation recently called for global cohesion around food and nutrition policy to address detrimental effects of the nutrition transition and promote healthier food choices. Given the extent of food trade in the modern world, consensus regarding food policy priorities is imperative to this global cohesion.

One of the primary objectives of the policy-Delphi is to gain clarification of different opinion (Turoff, 1970). To effectively meet this objective, participants were invited to comment on their ratings in the third and final round, particularly where it differed substantially from the median, to provide insight into why some options elicit a diverse response (O' Loughlin & Kelly, 2004). Given the logistical barriers of conducting a face-to-face group with participants across a large geographical area and under time constraints, this modification to protocol ensured that all participants were able to contribute to the data for qualitative analysis and a richer sample of data was consequently obtained than could have been drawn from a poorly attended focus group.

7.9 Summary of overall study

Chapter 6 and 7 present the findings of two analyses conducted as part of the Policy Delphi study. The key findings indicate that the majority of obesity-related, food policy options presented in this study were classified by participants as nonintrusive, of little or positive impact to autonomy and effective. All options were classified as high or somewhat of a priority. Even those considered slightly intrusive were not considered to negatively impact autonomy. The stakeholders perspectives classified the policy options in contrast to the classifications made from the view point of the Ladder and Balanced Ladder frameworks. The framing of policy options, from the Ladders viewpoint, currently acts as ethical and evidential barriers to progress. These findings suggest that stakeholders perspectives do not align with the Ladder viewpoint, and gives rise to further consideration of these acceptable policies.

Implication

Reframing obesity-related policy options through their impact to individual autonomy, as opposed to intrusiveness or impact to those with vested interests, may address polarised views around government 'intrusion'. Evaluating through an autonomy lens makes policy options more relatable to individuals, and encourages them to prioritise food-related policy options via the true impact to their lives. Governments should consider the impact of policy according to the position of stakeholders by actively seeking voice from underrepresented groups; particularly where there is good consensus amongst consumer, health practitioners and policy makers', in order to rebalance debate and strengthen public advocacy for obesity policy adoption.

CHAPTER 8: CONCLUSIONS AND IMPLICATIONS OF FINDINGS

8.1 Preamble

This chapter outlines how each of the preceding chapters has contributed evidence to address the research aim and objectives, and summarises the key findings of the four original research studies which form this thesis. The key findings are briefly discussed in the context of the current political environment and obesity crisis, and an illustrative theoretical model is presented. The implications to research and policy are outlined, conclusions are provided and future research directions are proposed.

8.2 Contribution to thesis aim

The findings of four original research studies, presented by the seven chapters of this thesis provide a valuable contribution to the literature regarding obesity-related policy in Australia. Table 8.1 illustrates how each chapter has contributed evidence to meet the aim and objectives of the research program and specifcially answered the research question defined in Chapter 2: *How are stakeholder perspectives of obesity-related policy options influenced by the concepts of intrusiveness and impact on autonomy?*

The strengths and limitaitons of each study are summarised in Table 8.2.

Table 8.1: Overview of thesis objectives and key findings

Research objective	Research method	Data analysis techniques	Chapter	Study/ publication	Specific study objective	Key findings
1. Explore an association between the concepts of intrusiveness and autonomy, and the effectiveness of interventions	Scoping review	Quantitative: Meta-analysis	3	*'The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school-based interventions.'* Status: Manuscript prepared, to be submitted to Obesity Reviews, May 2017	To assess the relevance of 'intrusiveness 'and 'autonomy' to school-based obesity prevention interventions, this review aimed to determine the feasibility of categorising published trial interventions through the Nuffield framework, and secondly identify whether the levels account for the variance in the effectiveness of, and heterogeneity among, interventions reported in published trials.	Level of intrusiveness may explain some of the variation in effect size of school-based interventions, however a greater volume of homogeneous data is required. Autonomy-positive and autonomy-negative school-based interventions may be equally effective for obesity prevention. Enhancing autonomy to the greatest extent may be most effective for obesity prevention in school settings.
	Systematic review	Quantitative: Meta-analysis	4	*'The effect of beverage positioning in retail environments on sugar-sweetened*	To assess the benefits and harms of beverage positioning interventions on sugar-sweetened beverage purchase and consumption.	There is limited evidence regarding the impact of beverage positioning in retail environments on sugar-

				beverage purchase and consumption' Status: Not yet published; search scope has been expanded to include other retail nudges, May 2017.		sweetened beverage purchase and consumption.
2. Identify the levels of intrusiveness and impact to autonomy, recommended by stakeholders to government policy decisions.	Document analysis	Qualitative: Content analysis Quantitative: Descriptive statistics (Frequencies, Chi squared).	5	*'Obesity prevention advocacy in Australia: an analysis of policy impact on autonomy'* *Status: Published Haynes et al, 2017*	To explore the feasibility of classifying stakeholder policy submissions, made directly to government, according to their impact on individual autonomy, and to consider the application of the concept to government-led obesity policy adoption.	There is a significant association between the impact to autonomy and stakeholder support for obesity policy. Interventions that increase individual autonomy were more frequently recommended, than those that reduce or have a negligible impact on autonomy.
3. Explore the concepts of autonomy and intrusiveness as a point of similarity and/or difference between stakeholder groups in	Document analysis	Qualitative: Content analysis Quantitative: Descriptive statistics	5	*'Impacting autonomy with obesity policy: A comparison of the recommendations made between*	To identify the similarities and differences in policy options recommended by different stakeholder groups, with regard to impact on autonomy.	There are similarities in the impact on autonomy of food-related recommendations, classified across the Balanced Ladder levels by four stakeholder groups.

recommending government policy options.		(Frequencies, Chi squared).		*stakeholder groups'* Status: Manuscript prepared, to be submitted to PLoS One, May 2017		In the context of food policy, industry variably made recommendations to enhance or reduce autonomy to the greatest extent, and most frequently recommended options with lesser impact to autonomy. Consumers most frequently recommended restrictive options which would reduce autonomy to the greatest extent.
4. Explore consensus amongst underrepresented stakeholders in classifying the policy intrusiveness and impact on autonomy, of food-related policy options for the Australian Government.	Policy Delphi technique	Quantitative: Statistics to calculate consensus and convergence (Median, IQR, relative IQR)	6	*Stakeholder perceptions of obesity-related food policy options for Australia: A modified-Policy Delphi study*' Status: Manuscript submitted to Public Health Nutrition, under review	To explore consensus on the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, of obesity-related food policy options, from the perspective of consumers, practitioners and policy makers in Australia. *Objectives:* 1.Identify the perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for a range of policy options representing the levels of	There is good consensus that the majority of food-policy options available to the Australian Government are considered nonintrusive and of negligible or positive impact on individual autonomy according to consumers, practitioners and policy makers perspectives. A confrontational social marketing campaign may be perceived as an intrusive

					the Nuffield Ladder of Intervention (the Ladder), according to participants. 2.Identify the degree of consensus amongst participants, regarding perceived intrusiveness, impact on autonomy, effectiveness and level of priority, for each policy option. 3.Compare participants' classification of policy intrusiveness and impact on autonomy with the classifications according to two ethical frameworks (the Ladder [15] and Balanced Ladder [21]).	intervention according to these stakeholders. There is high level consensus that regulations which target the food industry are nonintrusive interventions which would have no impact on individual autonomy.
5. Explore consensus amongst underrepresented stakeholders on perceived effectiveness and level of priority of food-related policy options in the Australian context	Policy Delphi technique	Quantitative: Statistics to calculate consensus and convergence (Median, IQR, relative IQR)	6	*'Stakeholder perceptions of obesity-related food policy options for Australia: A modified-Policy Delphi study'* Status: As for objective 4		There is good consensus that the majority of food-policy options available to the Australian Government are considered effective according to consumers, practitioners and policy makers perspectives. There is high level consensus that regulations which target the food industry would be very effective in addressing obesity.

						The majority of obesity-related food policy options presented achieved consensus as somewhat, high or very high priority options for the Australian Government. Policy options which would directly regulate the food industry achieved the highest level of consensus as very high and high priority policy options.
6. Identify potential contributors to individual perception of policy intrusiveness and impact on autonomy to improve understanding of how obesity policy can be better framed.	Policy Delphi technique	Qualitative: Directed content analysis.	7	'*Perceptions of policy intrusiveness and impact on autonomy: Considerations for obesity-related policy in Australia'* Status: Manuscript submitted to BMC Public Health, under review.	To identify potential contributors to individual perceptions of these concepts, to understand the reasons for differing perspectives and conflict with group consensus.	The role of change, benefit, consequence, and ones' preferred behaviour contribute to individual perception of intrusion and autonomy for three under-represented stakeholders in obesity policy. The dimension through which impact is quantified (e.g. to self or to others/industry; to liberty or to health) may further contribute to how these stakeholders perceive policy options in relation to their intrusiveness and impact on autonomy.

						Reframing policy options through the impact to individual autonomy as opposed to intrusiveness or impact to those with vested interests, makes policy more relatable to individuals, and encourages them to prioritise food-related policy options via the true impact to their lives.
7. Develop a practical framework to illustrate how stakeholder perspectives of intrusiveness and autonomy could be considered in the context of obesity-related policy decisions.	Policy-Delphi technique	Qualitative: Content analysis	7 & 8	'*Perceptions of policy intrusiveness and impact on autonomy: Considerations for obesity-related policy in Australia'* Status: As for Objective 6	The framework will be informed by the collective findings of all studies conducted and aims to practically apply the findings in the context of other research and current policy	It is important that decision makers and advocates consider perceptions of policy impact on change, benefit, consequence, preferred behaviour and the dimension through which its impact is quantified, as these may lead to variations in individuals perceptions of intrusiveness and consequently alter the of stakeholder support. Policy impact on autonomy can be applied to existing frameworks to specify the types of policies which should variably target individuals and industry stakeholders in order to bring about change through the four mechanisms of action.

Table 8.2 Summary of studies strengths and limitations.

Strengths and limitations	Study
The first study presents a novel approach to evaluating obesity prevention interventions. It is the first study to classify interventions from RCTs by their intrusiveness and impact on autonomy and to explore an association with effectiveness. In identifying limitations, this investigation excluded studies by outcome given the heterogeneity in measures for determining weight status for children. This limited the data available for analysis, and resulted in several under-powered sub-groups. A similar investigation into adult-targeted interventions may provide a larger pool of data, but may not represent interventions which span the full spectrum of the Ladder. It is valuable to identify independent components which are associated with most effective outcomes, to support policy makers and practitioners to develop effective strategies. The classification of multi-level strategies by the framework may be considered a limitation to this review given that increments in effect size may directly relate to the scale of intervention. However, we suggest that this supports the Ladder as more than an ethical framework, but a valuable tool for planning comprehensive, effective obesity interventions and classifying a number of potential strategies that employ a spectrum of mechanisms for change (Hawkes et al., 2015).	Chapter 3
This review presents an attempt to specifically explore the effectiveness of retail-level interventions which can be relatively easily applied to alter consumer behaviour around beverage choice and consumption. Although general findings of the effectiveness of choice architecture interventions on choice behaviour have been published, it is valuable to consider the specific effectiveness of these forms which may have a neutral impact on autonomy. The specificity of the review question limited the results, and may be considered a limitation, however the	Chapter 4

narrow review question provided evidence to indicate a clear lack of research in this area.	
This research provides a pragmatic, applied insight into real-world advocacy for government-led policy to address obesity in the Australian context. The analysis of submissions made to the inquiry provided a nationally relevant sample representing the diversity of stakeholders to obesity in a readily available format for analysis. In identifying limitations, the authors acknowledge the date of the Inquiry, which was the most recent federal inquiry in Australia; however, scarce implementation of fundamental components of the Australian preventative health strategy developed in response to this Inquiry, supports the ongoing relevance of understanding barriers to implementation to advance progress toward national health targets (Moodie et al., 2016). Furthermore, a comparison to recommendations made in recent national and global advocacy (WHO 2013; WHO 2016a, VicHealth 2016) illustrates clear alignment with current stakeholder advocacy. Considering recent events and likely enhanced awareness of the severity of the obesity epidemic, one could predict that support for bolder policy actions, including those which greatly reduce individual autonomy may be more prevalent currently, than when the data for this study was obtained. The analysis explores the impact on autonomy, setting and behaviour as variables to obesity prevention interventions. While the association between these variables and stakeholder support is remarkable, the independent influence of autonomy on support should be interpreted with caution. A number of policy characteristics are acknowledged as contributors to acceptability (Diepeveen et al., 2013), and therefore the concept should be valued as an addition to the larger portfolio of drivers to acceptability public health policy. The sample used in the analysis was limited to stakeholders who were motivated to submit to the government Inquiry. The use of a sample from alternative methods that engage consumers, such as public opinion surveys, (Barry et al., 2013) may	Chapter 5

have resulted in wider representation of stakeholders including individuals less likely to contribute to a formal government inquiry, such as children. However, the submissions provided an engaged, information-rich sample, which aligns with the primary objective of this research: to explore recommendations *'made directly to the Australian Government'* Inquiry. Analysis of stakeholder policy advocacy does not provide intelligence about the most effective or efficient policy responses to address obesity. It does provide insights about political acceptability and the various vested interests that influence policy responses. Both the framework and theory applied in this study are subject to interpretation of the concepts described, and therefore further investigation into stakeholder perceptions of the concept of autonomy and intrusion to choice is required.	
This study represents a novel attempt to exclude industry and academic perspectives in order to rebalance the debate and bring forward the views of stakeholders commonly underrepresented in obesity policy research and decisions. Iterative rounds provided opportunity for reflection with others, independent of vested interests, which enhanced conditions for genuine ratings and a deeper insight into the views of these stakeholders. A possible limitation is that the survey included obesity-related food policy options only; these options were prioritised based on the urgent need for effective food policy (GLOPAN, 2016, Swinburn et al., 2015), and was an amendment to protocol that ensured that the survey presented a feasible number of homogenous options for rating. Policies which aim to address physical inactivity are essential for a comprehensive obesity strategy (Taskforce, 2009, WHO, 2016a) and therefore a future investigation into policy options which target physical activity behaviours is recommended. Participants sampled were likely to have been individuals with a particular interest in this area, and socio-economic biases were not monitored or accounted for in the sampling method. However, such participants provide an information rich sample	Chapter 6 and 7

which is considered appropriate to address the research question and design. Men were poorly represented, and given that gender is associated with level of support for health-related policy interventions (Diepeveen et al.,2013), this was a limitation which emphasises the importance of actively seeking the views of male stakeholders. Finally, the triangulation in data analysis enhanced the credibility and confirmability of the findings, and the application of qualitative analysis provided depth to the interpretation of quantitative findings, through a deeper understanding of viewpoint (Ritchie et al., 2010, von der Gracht, 2012).	

8.3 Discussion of key findings

The individual findings of each of the studies are highlighted and discussed in their respective chapters. In reflecting on these findings, a number of key conclusions have been generated by the research program.

Reframing policy options

Firstly, the studies presented in this thesis validate the utility of policy impact on autonomy, as proposed by the Balanced Ladder framework, for assessing obesity-related policy options. Ethical concern about government interference to personal freedom has long been at the centre of debate about the implementation of government policies to address obesity. The Nuffield Ladder of Intervention has been a useful tool for governments to consider the strength of evidence in the context of ethical considerations to implementing public health policies to address complex issues. However, the concept of government 'intrusiveness' has provided a lever for lobbyists framing the debate and has consequently hampered the adoption of policies that are considered most intrusive, given the heightened demand for, and difficulties in obtaining, robust evidence to outweigh potential costs to liberty (Campbell et al., 2000; Crammond et al., 2013; Jochelson, 2006; Kite et al., 2015; Mayne et al., 2015; Nuffield Council, 2007; Yoong et al., 2014). The concept of libertarian paternalism challenges this position and is supported by the research presented. The findings presented in

this thesis suggest that the Balanced Ladder may be a more relevant and relatable tool for stakeholders to classify policy options to address obesity, taking into account the regressive nature of the current environment.

Viewing policy options through an autonomy lens may provide a means for decision makers to predict stakeholder resistance. The interplay of setting, target behaviour and stakeholders' perspective in the association between autonomy and support gives rise to the opportunity to explore policy options which impact autonomy differently, and tailor them to these variables. The utility of autonomy in defining the distinction between policy impact to industry and policy impact to individuals is highly valuable. It emphasises that industry-targeted regulations can positively impact individual's autonomy, which may have significant implications on the acceptability of such approaches. In this regard, reframing government-led regulation according to *individual* and *industry* autonomy may be a valuable driver for policy adoption and systems change.

The key findings contribute to existing research that is underpinned by agency-structure sociological theory (Jary, 1991), acknowledging that an effective coordinated approach to address obesity will encompass interventions across the agentic to structural continuum. Whilst empowering individuals to make healthier choices is a widely acceptable agentic approach, regulations located at the structural end may not be perceived to be as intrusive as predicted by the Nuffield Ladder. Given the value of structural interventions in preventing further exacerbation of socioeconomic inequalities through obesity-related policy (Backholer et al., 2014), the findings of this research provide a valuable contribution to advocacy for regulatory policies which modify the environment to facilitate and encourage healthy behaviours amongst the population.

Evidence to act

Secondly, the findings presented contribute valuable evidence to support the application of *obesity-related food policy* in Australia. There is good consensus amongst consumer, public health and policy stakeholders, that the majority of options available to the Australian Government are considered nonintrusive and perceived to have a negligible or positive impact on individual autonomy. The findings also suggest that there is limited concern amongst these stakeholders regarding insufficient empirical evidence of effectiveness when

prioritising strategies for implementation, and the majority of options available are perceived to be effective. Given that perceived effectiveness is a strong predictor of acceptability, governments should be reassured by consensus regarding the applicability of these policies to address obesity in Australia.

It is acknowledged that governments must act to address obesity ahead of the availability of 'best possible' evidence. The findings present valuable evidence which support governments to take bold action. The preference for autonomy-neutral and -positive actions (Chapter 5), and the interpretation of most food policies as autonomy-neutral (Chapter 6) indicate that stakeholders recognise the benefit of government intervention on individual autonomy as well as population health. It has been suggested that polices perceived in this way should be considered without 'special' evidence (Griffiths & West., 2015), and given the findings of this research, it brings into question the calls for greater evidence as a requirement to justify policy implementation. Governments should adopt the position of the Balanced Ladder and deliberate the heightened need for high-quality evidence to justify application of those interventions or policies which are perceived to simultaneously enhance individual autonomy and public health.

Stakeholder engagement in research and policy

There is a defined gap in evidence about the effects of consumer involvement in health policy decisions or how to effectively apply such methods in practice (Nilsen et al., 2006). To date public and patient involvement (PPI), has been mainly applied to health service provision and health care decisions (Boivin et al., 2014; Cowen et al., 2013, Hanley et al., 2004; Uhm et al., 2012) but to a lesser extent toward population-level public health policy. High-quality research trials have indicated the value of engaging consumers in healthcare decisions (Boivin et al., 2014), and to identify research priorities (Oliver et al., 2004; Oliver et al., 2009, Viergever et al., 2010) and in line with this movement, the application of PPI toward obesity policy has emerged. However, the value of these methods in the public health context has been subject to debate (Davey, 2015; Degeling et al., 2015; Hobley, 2012; Oliver de Vocht., 2015; Sharma et al., 2015) given the relatively limited research (Degeling et al., 2015; Nilsen et al., 2006). Applied methods have been relatively superficial, relying on social media or digital campaigns, and there are few defined platforms for public engagement in the prioritisation of health policy (Degeling et al., 2015; Jolley, 2012; Stewart et al., 2016).

Patient and public involvement (PPI) applied to obesity policy to date could be described as relatively tokenistic and efforts to enhance the rigour of the methods employed, and to clarify the utility of public involvement in obesity and health-related policy decisions are important to generate more meaningful outcomes (Illot, Norris, 2015; Li et al., 2015; Sharma et al., 2015).

The research methods presented in this thesis are highly relevant to this recent movement toward public engagement and collaborative methods for health-related research. The studies demonstrate the utility of applying PPI to population-level policy decisions. The findings generated by these methods, outlined in this thesis, highlight the value of bringing forward the perspectives of those commonly under-represented or over-powered by dominant stakeholders in obesity policy decisions. By excluding powerful conflicts of interest, the research has dispelled misconceptions which are barriers to policy adoption, and suggests that wider perspectives may be the key to mobilising bolder policy actions. The findings emphasise that governments should consider the impact of policy according to the position of stakeholders by actively seeking voice from under-represented groups, to ensure policy decisions incorporate the potentially divergent position of underrepresented stakeholders.

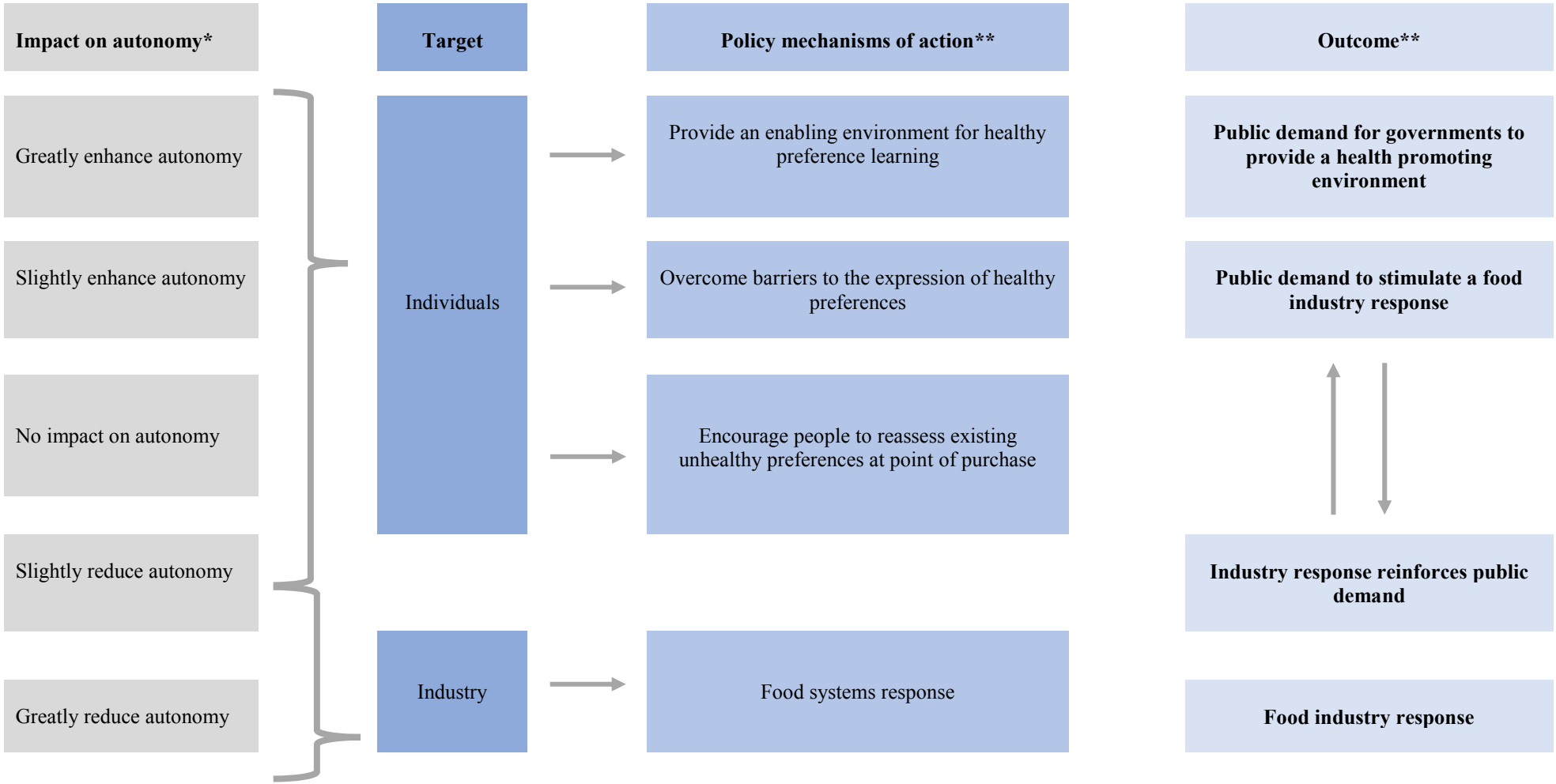
Engaging the public in policy decisions is more important now than ever before. In the last year, the western world has experienced substantial and radical changes in government administration, and these changes present a challenge for global public health over the coming years (McKee 2017). The unpredicted outcome of the European Union referendum in the UK, and the US presidential election outcome toward the end of 2016 are events that suggest societal discontent and indicate desire for change to the status quo. These positions may result from the want to reduce interference to personal freedom (McKee 2017), dominant political narratives (Stewart et al., 2016), appeals for government leadership or a general sense of society being disengaged in political decisions (EUPHA 2016). However, these events underline the importance of including broader stakeholder and public perspectives, as integral to bolder policy decisions. It is useful to consider the imperative for involving the public more transparently (and acknowledging their ‘expertise’) in policy making given these international shifts. The consequences of ignoring the public voice may have significant implications on what our democracy looks like.

8.4 Applying autonomy to potential mechanisms for change.

Behaviour change, at population-level, is required to effectively address obesity. Theories of change are useful to improve understanding of how interventions can work and can be specifically applied to obesity-related food policy actions (Hawkes et al., 2015). Hawkes and colleagues recently defined a framework encompassing four core mechanisms of change through which food policies can bring about behaviour change. The impact that policies have on *individual* and *industry* autonomy can be defined as a measure of influence to choice. It is proposed that these measures should be variably employed according to the target, to bring about change in a manner which minimises resistance around government 'interference'.

A model has been developed (Fig 8.1) to illustrate how the concept of autonomy is relevant to the specific mechanisms of change that obesity-related policies may confer. It proposes greater consideration of policy impact on autonomy to predict societal acceptability or resistance toward implementation.

Fig 8.1: Proposed model to illustrate the potential policy impact on autonomy, the target and mechanism of action leading to positive obesity outcomes.



**Griffith & West 2015; **Hawkes et al., 2015*

8.5 Implication of the research on policy

Explorative research which aims to justify obesity-related policy has been scrutinised for generating evidence which is largely irrelevant to policy decisions. Indeed, the importance of evidence on influencing policy adoption has been questioned. It is imperative that research methods which encompass meaningful consumer engagement and collaboration with decision makers are explored and applied as a potentially effective tool to progress population-level regulations to protect public health. The utility of these collaborative methods has been demonstrated by the research presented in this thesis and there is scope to apply these methods in other national contexts, and towards other complex public health issues where decision making is hampered by a lack of evidence.

Industry perspectives are dominant in influencing policy decisions. The strong influence of industry on research activity and outcomes has been long acknowledged, however the direct influence that these perspectives have on policy processes in Australia has only recently been highlighted (Cullerton et al., 2016, Swinburn & Wood, 2013). The findings of the research presented in this thesis indicates that the priorities of these powerful perspectives may deviate from other stakeholder groups, and where commercial and academic conflicts of interest are excluded from debate, there is high-level consensus around effectiveness and ethical considerations to obesity policy adoption. The Vienna Declaration emphasises the need to 'engage those who support health', and 'challenge those who threaten health', in order to strengthen public health policies (The Lancet Public Health, 2016). Figure 8.1 illustrates how the Balanced Ladder can guide decisions and ensure that policies are tailored to reduce the autonomy of those with priorities that threaten health. The findings presented here emphasise the value of bringing forward under-represented views, to rebalance debate, and suggest that this may be the key to bolder obesity-related policies.

Finally, reframing potential policy options through their impact to individual autonomy may strengthen societal support for bold policy actions which span all four mechanisms of change. Despite currently limited empirical evidence for the effectiveness of population-wide policy to address obesity, governments should be confident in implementing those which are perceived to simultaneously enhance individual autonomy and the population's health. According to this research, this comprises the majority of obesity-related food policy options available to the Australian Government.

8.6 Future work

The methods presented could be applied to other settings and countries, to enable an international comparison of stakeholder perceptions of these concepts. Additionally, it may be of value to apply similar methods to further understand industry and academic positions on the concepts explored, in order to overcome the practical and ethical barriers which have hampered policy progress to date. A key strength of such an approach is the identification of policies which may be more acceptable across the range of stakeholder groups, and the identification of those policies which are unpopular with industry stakeholders which makes lobbying mechanisms more transparent to everyone.

There are a plethora of factors to consider when developing and implementing policy. Although the ethical concepts outlined in this thesis are highly relevant to policy advocacy, it is essential to consider them in the wider context of other important implementation considerations. Several implementation considerations were indicated by the findings presented in chapter 7, including perceptions of interventions in terms of their feasibility. Potential for negative consequences as well as benefits for individual stakeholders, effectiveness, and likelihood of acceptability by other stakeholders. There is scope for further research to systematically explore these in greater depth. Additionally, given the demonstrated relevance of autonomy to obesity-related policy, there is opportunity for future research to consider this concept as a novel platform for assessing potentially effective approaches. Finally, there is scope to investigate the power of the concept of autonomy as an advocacy tool. Future research could assess the effectiveness of using the Balanced Ladder position to counter the current negative framing of obesity policy from vested interest perspectives.

It is important to communicate the findings of this research to policy decision-makers. Effective translation of this evidence into a practical framework is essential in applying the findings to practice, and must be prioritised to promote the utility of the methods described as vectors to closing the gap between research and policy. To meet this objective, the findings of the final study will be delivered to policy makers who were involved in the Delphi process,

and disseminated through conference presentations, peer-reviewed open access journals and platforms of social media to encourage media attention.

8.7 Conclusion

In conclusion, this research presents a first attempt to systematically apply the concepts of intrusiveness and impact on autonomy, to explore obesity-related policy options. This novel approach has generated evidence that suggests that there is support among stakeholders toward policies that increase individual autonomy, regardless of perceived intrusiveness. Furthermore, there is good consensus around obesity-related food policy priorities when polarised views are excluded from the debate.

It is important that decision makers and advocates consider how individuals interpret and quantify policy impact, particularly the degree of change, benefit and consequence perceived, as these may lead to variations in individuals' perceptions of intrusiveness and consequently influence stakeholder support. Policy impact on autonomy can be applied to existing frameworks to classify and evaluate policies which influence individuals and industry stakeholders in different ways. The consideration of the concept adds to the acceptability of different policies, rather than just focusing on the perceived effectiveness alone, in order to encourage healthy environments and behaviours.

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APPENDICIES

APPENDIX 3

A3.1 Presentations

This study has been presented at the following:

Oral presentations

Haynes, E.; Glasziou, P.; Reidlinger, D.. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school based interventions.

- Presented by Emily Haynes
- Chapter 3.4
- European Congress on Obesity (European Association for the Study of Obesity (EASO)) Gothenburg, June 2016
- Session: Thursday 2nd June 2016. RS11 – Fiscal measures: Taxes, subsidies, Incentives (RS11.04)

Haynes, E.; Glasziou, P.; Reidlinger, D. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school based interventions.

- Presented by Emily Haynes
- Chapter 3.4
- Bond University Faculty of Health Sciences and Medicine Higher Degree Research Conference, Robina, November 2015.

Poster presentations

Haynes E. Glasziou P. Reidlinger D. The Effect of Influencing Autonomy for Obesity Prevention: A meta-analysis of school-based interventions.

- Presented by Emily Haynes at the Gold Coast Health and Medical Research Conference. Gold Coast. November 2016.

Haynes E. Glasziou P. Reidlinger D. The Effect of Influencing Autonomy for Obesity

Prevention: A meta-analysis of school-based interventions.

- Presented by Emily Haynes at the Australian & New Zealand Obesity Society 2016 Annual Scientific Meeting. October 2016

Haynes E. Glasziou P. Reidlinger D. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school based interventions

- Presented by Emily Haynes at the European Congress on Obesity (European Association for the Study of Obesity (EASO)) Gothenburg, June 2016.

Haynes, E. Glasziou, P. Reidlinger, D. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school-based interventions.

- Presented by Emily Haynes at the International Congress on Obesity (World Obesity) Vancouver, May 2016

Haynes, E.; Glasziou, P.; Reidlinger, D. The effect of influencing autonomy for obesity prevention: A review and meta-analysis of school based interventions.

- Presented by Emily Haynes at the Bond University Faculty of Health Sciences and Medicine Higher Degree Research Conference, Robina, November 2015.

Haynes E. Glasziou P. Reidlinger D. Effective levels for school-based obesity prevention: Redefining interventions through the concept of 'intrusiveness'.

- Presented by Emily Haynes at the Gold Coast Health and Medical Research Conference. Gold Coast. 2015

A3.2: Search terms for scoping review

CINAHL 1982-present
EMBASE 1974- present
MEDLINE 1946 - present

Cochrane Library 1996 - present

Terms searched: (obes* OR diet* OR nutrition* OR physical activity) AND (school* OR child*) AND (review OR systematic)

Nineteen systematic reviews identified.

1. Sobol-Goldberg 2013
2. Katz 2008
3. Williams 2013
4. Kropski 2008
5. Whittlemore 2013
6. Lavelle 2012
7. Van Cauwenberghe
8. Gonzalez-Suarez
9. Silveria 2013
10. Li 2008
11.Friedrich 2012
12. Brown & Summerbell 2009
13. Lissau 2007
14.Cook-Cottone 2009
15. Shaya 2008
16. Zenzen 2009
17. Van Stralen 2011
18. Vasques 2013
19.Sbruzzi 2013

A3.3: Data extraction guide for interventions classification

Level	Strategy	Definition	Any school based intervention which includes:	Impact on autonomy Positive
1	Inform choice	Educate stakeholders by providing information to encourage healthy choice.	- Nutrition education - Posters or other media to inform - Educate on the benefits of physical activity - Informs students on how to engage in physical activity.	
2	Enable choice	Offering participation in healthy activities, or changing the environment to ensure that the healthy choice is always available.	- Facilitates physical activity by providing tools/resources i.e- games equipment, showers, bike racks/locks, extra play space, extra play time. - Sign posts to sports clubs - Provides healthy choices in the canteen - Provides water pumps. - Cycle lanes to school. - Provide cycle safety courses for students. - Provide gardens or kitchens to enhance skills. - Provide after school clubs or activities. - Traffic light labelling in canteen.	Positive
3	Guide choice through changing the default	Providing healthy alternatives as the default to enable and encouraging healthy choice.	- Changes default food option in the school canteen (i.e- provides salad instead of chips with burger) - Walking school bus. - Smaller portion sizes as default.	No impact
4	Guide choice through incentive	Providing a financial or tangible reward for choosing a healthy option or behaviour.	- Subsides healthier choice in the canteen - Rewards scheme for engaging in physical activity or school sports teams. - Rewards scheme for choosing healthy options in the canteen. - Using fictional characters to promote choice. - Enticing packaging for healthy choices.	Negative
5	Guide choice through disincentive	Making the unhealthy choice less desirable, or difficult to engage in through financial or tangible barriers.	- Increasing the price of unhealthy foods for sale at school. - Plain packaging on unhealthy food options. - Smaller portions of unhealthy foods. - Reduce the number of car parking spaces at school. - Undesirable alternatives to those not engaging in physical activity lessons.	Negative
6	Restrict choice	Removing unhealthy choice in the school setting.	- Reformulation of foods sold in canteen to ensure restrictions on total KJ/sugar/sat fat per serve. - Discontinue sales of sugar sweetened beverages or snacks at school. - Compulsory engagement in physical activity at school to restrict sedentary activity.	Negative

A3.4: Overview of levels employed by each study

Study ID	Highest level	Levels used	Nutrition	PA t	PAp
Angelopoulos 2009	6	1, 2, 4, 6	X		x
Burke 1998	6	1, 4, 6	X	x	x
Caballero 2003	6	1, 2, 3, 6	X	x	x
Coleman 2005	6	1, 3, 4, 6	X	x	X
Donnelly 1996	6	1, 4, 6	X		x
Donnelly 2009	6	6			x
Dzewaltowski 2010	6	1, 2, 6	X		x
Graf 2005 b	6	1, 2, 6	X	x	X
Graf 2008	6	1, 2, 6	X	x	x
Fitzgibbon 2006	6	1, 6	X		x
Foster 2008	6	1, 2, 4, 6	X	x	
Foster 2010	6	1, 2, 3, 4, 6	X	x	x
Jansen 2011	6	1, 2, 6	X		x
Jiang 2007	6	1, 2, 6	X		
Kriemler 2010	6	6		x	x
Lazzar 2007	6	6			x
Li 2010	6	1, 6	X		x
Luepker 1996	6	1, 6	X	x	X
Manios 2002	6	1, 2, 4, 6	X	x	x
Mo-Suwan 1998	6	6			x
Nader 1999	6	1, 2, 3, 6	X	x	x
Neumark-Sztainer 2003	6	1, 2, 3, 6	X	x	x
Peralta 2009	6	1, 4, 6		x	x
Reilly 2006	6	1, 6		x	X
Sahota 2001	6	1, 2, 3, 4, 6	X	x	x
Salcedo Aguilar 2010	6	4, 6			x
Salmon 2008	6	1, 2, 6		x	
Sevnic 2011a	6	1, 2, 6	X		x
Siegrist 2013	6	1, 2, 6	X	x	x
Singal 2010	6	1, 2, 6	X		x
Singh 2009	6	1, 2, 3, 6	X	x	x
Spigel 2006	6	1, 2, 6	X	X	
Stock 2007	6	1, 6	X		X
Trevino 2004	6	1, 2, 6	X	x	x

Van Dongen 1995	6	1, 6	X	x	x
Williamson 2012	6	1, 2, 6	x	x	X
Barbeau 2007	4	2, 4			x
Haerens 2006	4	1, 2, 3, 4	X	x	X
Neumark-Sztainer 2009	4	1, 2, 4	X	x	X
Simon 2008	4	1, 2, 4		x	x
Warren 2003	4	1, 2, 4	X		
Llargues 2011	2	1, 2	x	x	
Pate 2005	2	1, 2			
Plancha-Danielzik 2011	2	1, 2	x		x
Robinson 1999	2	1, 2		X	
Sevnic 2011b	2	1, 2	x		
Webber 2008	2	1, 2	x		x
Yin 2005	2	2			x
Amaro 2006	1	1	X	X	
Aquilani 2007	1	1	X		
Chavarro 2005	1	1	X	X	
Ezendam 2012	1	1	X	X	
Gortmaker 1999	1	1	X	X	
James 2007	1	1	X		
Mihas 2010	1	1	X		
Sichieri 2009	1	1	x		

A3.5: Studies excluded during full text assessment with reasons

Reason for exclusion	Study
Not RCT	Veugelers 2005, Datar 2004, Fernandes & Strum 2011, Fernandes 2010, Heelan 2009, Hinrichs 2010, Jones 2003, Lionis 1991, Millimet 2008, Millimet 2009, Millimet 2010, Resnicow 1993, Tamir 1990, Taylor 2007, Wiliamson 2007, Baxter 2010, Chiodera 2008, Chomitz 2010, Edwards 2005, Fox 2009, Harrison 2011, Hernandez 2011, Heude 2003, Jamner 2004, Jordan 2008, Kain 2009, Kain 2004, Kimm 2005, Ransley 2007, Whittemore 2013, Yin 2005, Lafay 1998, Trudeau 2001, Zhu 2010, Danielzik 2005, 2007.

Same data	Kafatos 2005, Kafatos 2007, Planchta-Danielzik 2011, Yin 2005, Lohman 2003, Manios 1999, James 2004, Simon 2006, Manios 1998, Singh 2007, Martinez-Vizcaino 2008, Graf 2005[a].
< 6 months	Bayne-Smith 2004, Eliakim 2007, Flores 1995, Goran 2005, Harrell 1996, Killen 1988, McMurray 2002, Pangrazi 2003, Robbins 2006, Sadowsky 1999, Sotry 2003, Turnin 2001, Ask 2006, Ask, 2010, Duncan 2009, El Ansari 2010, Fitgibbon 2011, Harrison 2006, Kipping 2008, Lubans 2010, Minhas 2010, Rosenbaum 2007, schofield 2005, Spruijt-Metz 2008,
No BMI/Z	Winett 1999, Young 1993, Angelico 1991, Boaz 1998, Cason 2006,Dennison 2004, Duncan 1983, Friel 1999, Gans 1990, Gortmaker 1999b, Haerens 2007b, Harrell 2005, Hassapidou 1997, Hopper 1992, Hortz 2008, Klepp 1993, Liu 2008, Liong 2004, Loughridge 2005, McKenzie 2001, Parker 2001, Passmore 2005, Pearson 2002, Reinaerts 2007b, Rowland 1995, Sahota 2001b, Sallis 1997, Shemilt 2004a, Shemilt 2004b, Shilts 2009, Skybo 2002, Stephens 1998, Stewart 1995, Viskic-Stalec 2007, Walter 1986, Walter 1988, Wind 2006, Agron 2002, Anderson 2007, Araujo-Soares 2009, Bere 2006, Bere 2005, Bonhauser 2005, Casazza 2007, Chatzisarantis 2009, Christodoulos 2006, Dishman 2004, Dunton 2007, Dzewaltowski 2009, Eriksen 2003, Fogarty 2007, Frenn 2003, Freen 2003, Freen 2005, Graham 2008, Gratton 2007, Haerens 2008, Haerens 2006, Haerens 2009, Hawley 2006, Hill 2007, Horne 2004, Kothe 2012, Linden 2006, Lowe 2004, Lubans 2010, Lbans 2009, Lytle 2009, Mangunkusmo 2007, Marks 2006, Matens 2006 Martens 2008, O'Brein 2002, Panunzio 2007, Perez-Rodrigo 2005, Prell 2005, Reinarts 2007, Robinson 2006, Tak 2007, Taymoori 2008, Te Velde 2008, Valdimarsson 2006, Warren 2003, Wehling Weepie 2002, Wells 2007, Wilson 2005, Wind 2008, Woolfe 2005, Zizzi 2006
No f/u BMI	Stewart 1997, Chin A Paw, 2008, Dishman 2005
Not school	Paradis 2005, Gentile 2009, Economos 2007
Ow/Ob only	Wong 2008, Carrel 2005, Grey 2004, Huang 2007, Perman 2008, Wafa 2011, Weintraub 2008, Croker 2012, Estabrooks 2009, Goldfield 2006, Golley 2007, Graf 2006, Johnson 2010, Johnson 2007, Johnson2007b, Kalarchian 2009, Kalavainen 2007, Melnyk 2007, Muckelbauer 2009, Mucklebauer 2009, Sacher 2010, Toruner 2010, Waling 2010.
Protocol	Ezendam 2007, Zahner 2006
Self report BMI	Mauriello 2010, Sallis 2003.

APPENDIX 4

A4.1: Original search strategy

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) 1946 to Present

#	Searches	Results
1	Beverages/	12803
2	exp Carbonated Beverages/	2354
3	Energy Drinks/	414
4	"Fruit and Vegetable Juices"/	184
5	Cola/	83
6	((beverage* or drink* or water or soda* or juice* or cordial or cordials or cola or colas or lemonade*) adj3 (sugar* or sucrose or non-diet or sweet* or high-calorie or high-kilojule or flavo?red)).tw.	6993
7	((sports or energy or electrolyte) adj3 (drink* or beverage*)).tw.	1811
8	or/1-6	20183
9	Environment Design/	4740
10	"Facility Design and Construction"/	8626
11	Choice Behavior/	26248
12	choice architecture.tw.	47
13	nudg*.tw.	550
14	access*.tw.	361742
15	position*.tw.	486506
16	place*.tw.	762966
17	proximity.tw.	41197
18	distanc*.tw.	207926
19	assortment structure.tw.	3
20	or/9-19	1767613
21	and/8,20	2178
22	animals/ not (humans/ and animals/)	4271803
23	21 not 22	1773

/ signifies a database-specific keyword (MeSH term in MEDLINE)
exp signifies that the MeSH term has been "exploded" to capture all the other more specific terms under it.
(PubMed works in the reverse – it assumes you want to explode terms – you have to tell it not to)
***** truncation symbol
? finds spelling variants e.g**. flavo?r.tw.** will retrieve flavour or flavour

.tw. finds the word or phrase in title or abstract
adj proximity syntax i.e. (beverage adj3 sugar*) will find the first word or phrase within 3 words of the other word
or phrase
Line 8 = total "beverages" MeSH or Textwords
Line 20 = total "positioning" MeSH or textwords
Line 21 = total "beverages" AND positioning
Line 22 excludes most animal-only studies, but will leave in any studies that are about both humans and animals, or humans only, or studies where the indexer has not applied the terms humans/ or animals/
Line 23 = total records to screen

A4.2: Updated review protocol and progress

The protocol for the original review entitled '*The effect of beverage positioning in retail environments on sugar-sweetened beverage purchase and consumption'* has been amended. The modified version was developed to broaden the scope of the review whilst maintaining adequate specificity to generate relevant and practically applicable results to guide policy decisions to reduce the purchase and consumption of SSBs. The modified review is entitled '*The effect of implementing nudge interventions toward beverages in retail environments on sugar-sweetened beverage purchase and consumption'.* The final version is due for completion in July 2017.

Objective

This review aimed to assess the existing literature around 'choice architecture' interventions specifically for reducing SSB intake, within the retail environment or 'at point or place of purchase'. Included RCT's, pre- and post-designs which use any 'choice architecture' or 'nudging' intervention as defined by Hollands (2013), which are implemented at retailer level and aim to alter SSB purchasing and/or consumption.

Modifications to methods outlined in the original protocol

The updated version of this review will;

- Include trails which implement *any choice architecture intervention* defined by Hollands (2013) typology (no longer limited to placement/positioning only). These are

defined as those which alter properties and/or placement and classified by one of the following intervention types: Ambience, functional design, labelling, presentation, sizing, availability, proximity, priming or prompting.

- Include trials conducted in *any retail environment* where beverages are available for purchase but excludes any non-self-service café/restaurant (i.e. where individuals are required to order from menu).

The review will remain the same in excluding trials implemented at manufacturer level (i.e. product labels, reformulation); or which do not report beverage-related outcomes independent to other outcomes; or which implement taxes; or which are conducted in non-self-service café/restaurant/outlet.

PICO

P: Whole population

I: Choice architecture intervention (as defined by Hollands et al): include promotions at point of purchase (financial subsidies) but not taxes as looking at only those implemented at the retail level.

Implemented within retail environment 'place or point of purchase'

Which aims to reduce SSB purchase or consumption, or promote healthier beverage consumption.

C: No intervention, taxes.

O: Beverage sales, consumption, attitudes to change.

Table A4.1: Inclusion/Exclusion criteria for updated review.

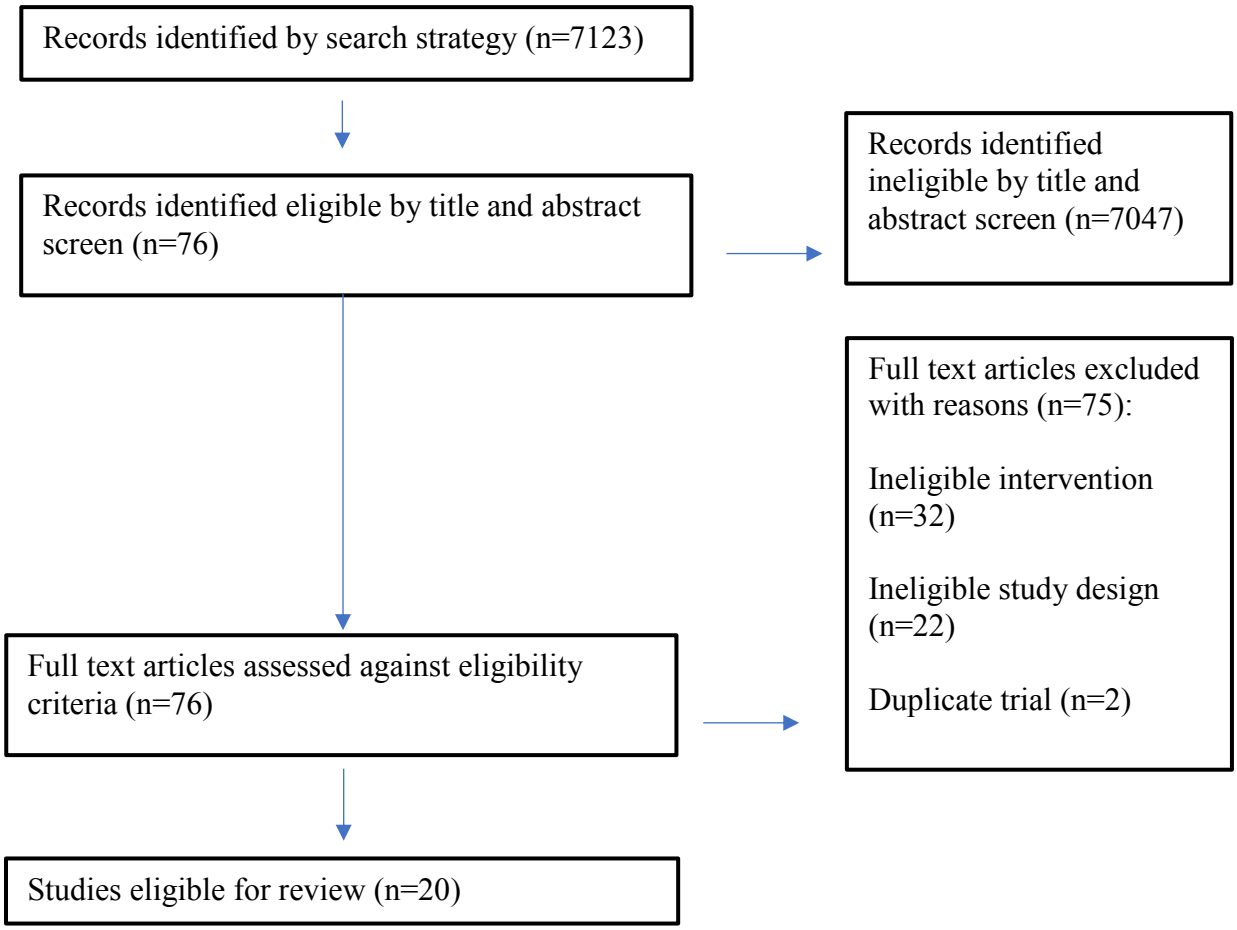
	Inclusion	Exclusion
Intervention	Any choice architecture/nudging strategies (defined by Holland) implemented at the retailer level, which changes the retail environment to alter beverage choice, purchase and/or consumption, energy selection/consumption from beverage, in isolation from other food choice.	Taxes, front and back of pack labelling alone.
Setting	Supermarkets, grocery stores, corner stores, small food stores, convenience stores, service stations, public setting self-service café (i.e. in school, workplace, hospital).	Non-self-service café/restaurant (i.e. ordering from menu).
Study design	RCT (including quasi-, cluster-randomised), non-randomised controlled trial, pre-post experimental study.	Cross-sectional, non-intervention, observational studies.

Outcome	Must report beverage outcome data: *Primary* Beverage choice, beverage purchase, and beverage consumption, energy selection/consumption (KJ) from beverage in isolation from other food choice/purchase/consumption; sales data for SSB or other beverage, self-reported purchase. *Secondary* Increase in healthier choice (reduced overall energy/increase other nutrient density. Attitudes to intervention (consumer/facilitator/manufacturer/retailer) including but not limited to acceptability and feasibility.	Food and beverage outcomes reported together. Intended behaviours.

Preliminary search

As a result of the learnings of the original review, a preliminary screen was conducted by applying the new eligibility criteria to the results of the previous search strategy. The 76 reports which were identified for full text assessment in the first version of the review were screened (EH).

Fig A4.1: Results of the preliminary screen



Of the original 76 identified for full text screen, 20 were identified for inclusion according to the updated eligibility criteria; *Allan 2015, Bergen 2006 ,Brown 2009, Cradock 2015, Donohoe 2014, Foster 2014, Haerens 2007, Jue 2012, Kral 2016, Levy 2012, Olstad 2016, Petrescu 2016, Roberto 2016, Thorndike 2014, Thorndike 2012, Van Hulst 2013, Visscher 2010, Wilson 2015, Wolfenden 2015, Wong 2015.*

As a result, the updated protocol was deemed appropriate and the search strategy revised.

Search strategy

A comprehensive search was conducted in the following electronic bibliographic databases: MEDLINE, CINAHL, EMBASE, Scopus, The Cochrane Library, PsycINFO and Pre-Medline. A detailed search strategy included terms relating to the additional interventions

included in the modified protocol to broaden the results. The preliminary search was developed in MEDLINE and adapted for use in other bibliographic databases. The search included all entries published until the start of the search (November 2016) and was filtered to human trials reported in the English language only. An update of the primary strategy was performed in addition to the second strategy and provided an additional 74 records. The records identified by the second strategy were de-duplicated against the first to provide a further 5725 records. These were combined to provide an additional 5799 records for a title and abstract screen.

Table A4.2: Results of the primary and secondary search strategies.

Database	**SSB Strategy 1 (September search)**	**SSB Strategy 1 Update (November 8th search)**	**SSB Strategy 1 Update (November 22nd search)**	Total Strategy 1	**SSB Strategy 2 (minus Strategy 1) (November 22nd search)**	TOTAL screened for revised strategy
MEDLINE	2265	50	1	2316	1950	4266
EMBASE	3316	76	17	3409	2865	6274
CENTRAL	2956	502	0	3458	534	3992
CINAHL	910	7	53	970	1623	2593
PsycINFO	661	7	3	671	545	1216
TOTAL	10108	642	74	10824	7517	18341
less Duplicates	2985	513	0	3498	1792	5290
Total to screen	**7123**	**129**	**74**	**7326**	**5725**	**13051**

It is anticipated that the full text screen will be conducted in May 2017.

Data extraction

A data extraction form, developed by the review team and informed by the TiDier checklist, will be used to extract all relevant data. Two reviewers will conduct data extraction and cross-compare for consistency.

The reviewers will extract the following information:

1. Basic study characteristics (authors, date of publication, study design, study population, setting, duration)
2. Aim of intervention (including rationale/theory)
3. Full description of intervention(s)/control conditions, including materials/procedures.
4. Primary and secondary outcome measures planned.
5. Outcomes measured/reported - results .
6. Compliance with TiDier checklist reporting standards.

Quality assessment

Risk of bias assessment was planned in line with the Cochrane Collaboration risk of bias assessment tool. Two reviewers were to independently assess each study, and any discrepancies discussed between reviewers and, if necessary, a third reviewer. The overall risk of bias was to be reported as high, low or unclear and for each source of bias: selection, performance, detection, attrition and reporting bias.

Strategy for data synthesis

The results from eligible studies reporting the same outcome measure will be summarised using meta-analysis. We will conduct a meta-analysis where sufficient (homogeneous) outcomes are available. Studies which cannot be summarised quantitatively will be reported narratively. Dichotomous outcomes will be analysed using odds ratio, and continuous data analysed using standardised mean difference (95% confidence-interval). A generic-inverse variance method will be used, and given the likely heterogeneity of studies, a random effects model employed. The presence of statistical heterogeneity will be quantified using a Chi-square and I-suared statistic. Evidence of low, moderate and substantial heterogeneity will be defined using pre-determined cut-offs; <30% = low, 30-60% = moderate and >60% = substantial. A fixed effects model will used in the event of multiple small studies within a meta-analysis as a sensitivity analysis (in addition to random effects analysis). Adverse events will be reported narratively.

Analysis of sub-groups

We will use sensitivity analyse to explore the impact of different intervention arms (i.e those which compare nudging strategies to more intrusive/restrictive interventions). We will also explore the impact of the inclusion of trials which are considered likely to introduce bias. If the total heterogeneity is high, we will subgroup trials by specific setting and target population (adults/children), to further explore difference in effect size.
If more than 10 studies for an outcome are identified with no high level heterogeneity, funnel plot will be employed to assess for small study effects (publication bias).

Review team

Miss Emily Haynes, Faculty of Health Sciences & Medicine, Bond University, Queensland, Australia

Dr Suetonia Palmer, Department of Medicine, University of Otago, Christchurch, New Zealand

Dr Dianne P Reidlinger, Faculty of Health Sciences & Medicine, Bond University,Queensland, Australia

Anticipated completion date

July 2017

APPENDIX 5

A5.1 Presentations

Oral presentations

Haynes E. Hughes R. Reidlinger D. Enhancing or diminishing autonomy for obesity prevention: An analysis of the 'intrusiveness' of policy recommendations to the Australian government.

- Presented by Emily Haynes
- European Congress on Obesity (European Association for the Study of Obesity (EASO)) Gothenburg, June 2016
- Session: Friday 3rd June 2016. PP2 - Health, Behaviour and Environment I (PP2.06) Oral poster pitch.

Haynes E. Hughes R. Reidlinger D. The Cost to Autonomy For Obesity Prevention in Australia: An Analysis Of The 'intrusiveness' Of Policy Recommendations.

- Presented by Emily Haynes
- International Congress on Obesity (World Obesity) Vancouver, May 2016
- Session: Tuesday 3rd May 2016. Pecha Kutcha Competition.

Haynes E. Hughes R. Reidlinger D. To nanny or nudge to prevent obesity? An analysis of the 'intrusiveness' of stakeholder recommendations to the Australian Government.

- Presented by Emily Haynes
- Australian & New Zealand Obesity Society 2016 Annual Scientific Meeting. October 2016
- Session: Thursday 20th October 2016. Concurrent session: Public Health Policy.

Haynes E. Hughes R. Reidlinger D. Enhancing or diminishing autonomy for obesity prevention: An analysis of the 'intrusiveness' of policy recommendations to the Australian government.

- Presented by Emily Haynes
- Gold Coast Health and Medical Research Conference. Gold Coast. 2016

Poster presentations

Haynes E. Hughes R. Reidlinger D. Enhancing or diminishing autonomy for obesity prevention: An analysis of the 'intrusiveness' of policy recommendations to the Australian government.

- Presented by Emily Haynes at the European Congress on Obesity (European Association fro the Study of Obesity (EASO)) Gothenburg, June 2016.

Haynes, E. Reidlinger, D. Hughes, R. Enhancing or diminishing autonomy for obesity prevention: An analysis of the ' intrusiveness' of policy recommendations to the Australian government.

- Presented by Emily Haynes at the International Congress on Obesity (World Obesity) Vancouver, May 2016

Haynes, E. Reidlinger, D. Diversity of stakeholder recommendations for responding to obesity in Australia: An investigation into the influence of options on autonomy.

- Presented by Emily Haynes at the International Congress on Obesity (World Obesity) Vancouver, May 2016

A5.2: Additional justification of methods employed

The Government Inquiry was identified as the most recent, relevant, comprehensive and concise database of stakeholder advocacy related to obesity in Australia in the last decade. The objective of a government inquiry is to explore stakeholder perspectives in the form of submissions from individuals or organisations, and commonly results in a report to Parliament to inform decisions. There are no restrictions to those eligible to submit, and submissions may be made anonymously and therefore the process provides a respectful opportunity for data collection encompassing a diverse range of perspectives disclosed free from obligation.

Submissions made to the Inquiry were accessible in text format which provided a convenient sample of data from a number of stakeholder perspectives. The use of pre-existing data was considered appropriate given the potential for conflicting opinions and logistical difficulties

of facilitating face-to-face methods with stakeholders from various perspectives, across a large geographical area.

Directed content analysis was performed independently via repeated readings and extraction of explicit recommendations from each submission. Quotes and summaries were extracted for analytical triangulation by the research team to enhance the validity and reliability of results. A number of approaches to content analysis exist, however a directed approach to the analysis for this study was deemed most appropriate as the underlying theoretical framework was predefined (Hsieh & Shannon, 2005).

Qualitative research methodology is increasingly used both independently, and as part of a mixed method approaches in public health. Qualitative techniques have been employed to provide evidence toward obesity interventions (Brown & Gould, 2011), and to explore public policy issues (Ritchie & Spencer, 1994) and to provide evidence within the wider context of health research (Boulton & Fitzpatrick, 1994; The PLoS Medicine Editors, 2007). Qualitative research techniques provide a depth to analysis which is imperative to adequately explore the complexity of multi-dimensional issues surrounding obesity and policy implementation (Ritchie & Spencer, 1994).

Medicine and policy-related research have traditionally prioritised the value of quantitative methods in providing empirical evidence to inform practice. However, recent developments in the available guidance for conducting qualitative methodology provide an opportunity to further strengthen the value and quality of qualitative research to optimise its use in practice (Brown & Gould, 2011; Tong et al., 2007). Given the timely nature of qualitative data analysis techniques, the text submissions from one, most relevant Inquiry into obesity was identified as a feasible body of evidence for analysis.

The value of summarising data by applying quantitative data analysis to such methods is recognised (Ritchie & Spencer, 1994; Gouldon et al.,2011) and therefore, data was summarised using basic descriptive statistics in the form of frequency counts by stakeholder group and each of level of the five and three level frameworks of autonomy. Chi-square test for independence was employed as a non-parametric statistical test to explore significance ($P<0.05$) between levels recommended using SPSS Statistics for Windows (Ver 23.0. IBM,

New York). A non-parametric test was considered essential given that the data was not normally distributed.

Further, Chi-squared for independence was considered most appropriate given the categorical nature of the data and presence of more than two variables within each category. The only submission variable of interest within this analysis was the stakeholder group of the submitter; however, a more complex model of analysis may have been considered if the data contained multiple submission variables as well as variable recommendations. Where a significant association was identified (<0.05), data was explored further to interpret the primary contributor to the association.

Obesity prevention advocacy in Australia: an analysis of policy impact on autonomy

Emily Haynes,[1] Roger Hughes,[2] Dianne P. Reidlinger[1]

Abstract

Objective: To explore obesity policy options recommended by stakeholders and identify their impact on individual autotomy.

Methods: Qualitative and quantitative methods were used. A content analysis of submissions to the Australian Government's Inquiry into Obesity was conducted. Each recommendation was categorised by its impact on autonomy, according to existing frameworks. Chi-square test for independence was used to explore the association between autonomy and stakeholder support defined as frequency of recommendation.

Results: The extent of support for a policy option was significantly associated with impact on autonomy ($p<0.001$). Options that reduce autonomy were least frequently recommended in every setting; but more likely in schools (27%) than other settings (<1%). Recommendations to provide incentives (9%) were more common than disincentives (2%) or restrictions (3%), and those that enhance autonomy were most widely recommended (46%).

Conclusions: Stakeholders advocated policy options that enhance individual autonomy to a greater extent than those that diminish autonomy.

Implications for public health: Targeting obesity policy options that enhance rather than diminish autonomy may be more politically acceptable across most settings, with the exception of schools where more restrictive policy options are appropriate. Re-framing options accordingly may improve leadership by government in obesity policy.

Key words: obesity, policy, Nuffield, public health, intrusiveness, autonomy, review

It is widely accepted that elected governments have a primary responsibility to protect and promote the public health.[1,2] The adequacy of government health policy is often determined by the politics of policy formulation, policy implementation and resource allocation, significantly influenced by advocacy from often competing and vested interest groups.[3] The World Health Organization supports government policy as an instrument for intervention in the interest of obesity prevention.[4] Delivering well-aligned, national, regional and local policy action is imperative to enable supportive environments for targeted intervention.[4,5]

Despite a plethora of national and global policy recommendations addressing obesity prevention, Australia remains without an extant national obesity strategy, and the majority of objectives of the most recent preventative health strategy, which relate to healthy weight, diet and physical activity, remain largely unimplemented.[6] At state and local level, policy development and implementation has shown more promise,[7,8] however, there is inconsistency between states and an absence of a coordinated national policy response to obesity. This is at odds with the well-resourced and highly coordinated lobbying efforts of the food and beverage industry.[9]

The Australian Government has a track record of success in reducing high-risk health behaviours through national legislation, despite the difficulties associated with legislating in the interest of public health, often in direct conflict with other, largely commercial interests.[10] Legislation has been successfully applied to promote smoking cessation, reduce drink driving and introduce compulsory seatbelt use.[11] To date there has been limited enthusiasm by Government to apply similar policy instruments to address obesity, mostly been confined to a low-level, self-regulatory approach that emphasises personal responsibility.[12,13] This approach aligns with the advocacy position of commercial interests, which lobby for deregulation, unrestricted marketing practices and against government protections for consumers.[9,10]

While prevention efforts have been focused on individual behaviour change for obesity, concerns have arisen about the unintended consequences of such an approach on vulnerable populations, specifically children and low-income communities. The focus on individual responsibility has been proposed as a threat to effective prevention, through unhelpful stigmatisation.[14] Further, the adoption of interventions with a narrow definition of health (focused on weight, rather than a more holistic view of health), has been associated with an increase in disordered eating behaviours, and has resulted in further prevention efforts to normalise body image and eating behaviour in young people.[15] Of great concern is the potential

1. Faculty of Health Sciences and Medicine, Bond University, Queensland
2. School of Public Health, Massey University, New Zealand
Correspondence to: Miss Emily Haynes, Faculty of Health Sciences and Medicine, Bond University, Promethean Way, Robina, QLD 4226; e-mail: ehaynes@bond.edu.au
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to exacerbate existing inequalities in health across the socioeconomic gradient where interventions may impose a larger burden on those most disadvantaged, for example taxes on unhealthy foods.[16] Interventions focused on information and knowledge have been demonstrated to be less effective for people from lower socioeconomic positions and more likely to widen health inequalities.[17] A comprehensive systems approach that encompasses all dimensions of the socio-ecological model and individuals' interactions with the systems operating within the environment, is supported by public health advocates to avoid some of these unintended harms.[18,19] In Australia, this requires an inclusive package of local, state and national policy actions. However, a lack of policy leadership by government and the associated lack of accountability to government by stakeholder groups is recognised as a primary barrier to progress in obesity prevention.[19]

The policy-making process by government is not always a linear or rational process, often deviates from expert health opinion and to varying degrees is influenced by advocacy.[3] In a political environment with conflicting interests, policy makers can be constrained by a lack of evidence; a recognised barrier to government policy development and implementation.[3,20,21] In the context of obesity, the evidential 'gaps' have been attributed to the complexity of implementing population-wide pragmatic interventions without justifiable evidence, or a result of poor translation and dissemination from science to politics.[22-25] There is insufficient evidence on the effectiveness of obesity policy itself,[5,22] and it has been claimed that published evidence on the effect of obesity interventions generally has little relevance to policy makers.[24] Therefore, regardless of the significance of research findings, policy change may not be established, particularly where political and public will is lacking.[3,26]

Despite these complexities, government-led policy is necessary.[19] Where the best 'possible' evidence is not obtainable, stakeholder opinion may be valued as the best 'available'.[27] One mechanism used by Australian governments to achieve best available evidence is to formalise a government inquiry, such as the last Australian Government Inquiry on Obesity in 2008.[28] The aim of such an inquiry is to explore stakeholder perspectives to inform policy decisions, however, the significance of this in practice is under-explored.

Given the complexity and uncertainty relating to policy interventions to address obesity, conceptual frameworks that help to interpret the function, effect and implementation of policy are important. A number of tools have been proposed and applied to interpret obesity policy options. One such Obesity Policy Framework[5] categorises policies as downstream or upstream; downstream being those that 'improve the ability for individuals to make appropriate healthy choices' and 'upstream' measures being those that 'increase the opportunities to make healthier choices or restrict the counteracting influences on healthy choice making'.[5,29] The Nuffield Council on Bioethics describe a similar concept, and categorise policy intervention by the level of intrusiveness to individual choice.[2] They suggest public health policy can be categorised across an escalating 'Ladder' of eight levels of intrusiveness, from doing nothing to restricting or eliminating choice, and several of these levels are reflected in food policy frameworks.[30-32] The Nuffield Council suggest that high-level, restrictive, upstream policies require greater evidence to justify and may be less publicly and politically acceptable than lower level options.[33] Recent research suggests that these 'types' of high-level intrusive policy may have a greater impact on obesity-related outcomes than lower level informative strategies.[22]

A recent modification to the Nuffield Ladder proposes that restrictive policies diminish individual autonomy, which in turn influences the degree of ethical concern around implementation.[34] The Griffiths and West's framework (known as the Balanced Ladder of Intervention) assigns positive and negative numerical values to the Nuffield Ladder rungs to describe the influence to autonomy of interventions focused at different levels, which can be further collapsed to a simple 5-point autonomy scale (Table 1).

The general concern about developing a 'nanny state' and intruding on individual choice, has been used to avert government regulation and environmental change to address obesity world-wide.[35] Given that the focus of criticism about government intervention has been on individual freedom,

Table 1: Description of the different categorisation levels of the Nuffield Ladder[a] and Balanced Ladder[b] of intervention, with examples.

Nuffield Ladder level[a] (intrusiveness)	Balanced ladder level[b] (impact on autonomy)	Pooled level of impact on autonomy (for this review)	Example description[1]
Eliminate	-4	-2 Diminish	*Eliminate choice* – Regulate in such a way as to entirely eliminate choice, e.g. compulsory isolation of patients with infectious diseases.
Restrict	-3		*Restrict choice* – Regulate in such a way as to restrict the options available to people with the aim of protecting them, e.g. removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants.
Disincentives	-2	-1 Reduce	*Guide choice through disincentive* – Fiscal and other disincentives to influence people not to pursue certain activities, e.g. taxes on cigarettes or discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.
Incentives	-1		*Guide choice through incentive* – Regulations that guide choices by fiscal and other incentives, e.g. tax-breaks for the purchase of bicycles that are used to travel to work.
Do nothing	0	0 Neutral	*Do nothing or simply monitor the situation*
Change the default	0		*Guide choice through changing the default policy* – e.g., in a restaurant, instead of providing chips as a standard side dish (with healthier options available) menus could be changed to provide a more healthy option as standard (with chips as an option available).
Inform	+1	+1 Increase	*Provide information* – inform and educate the public, e.g. campaigns that inform people of the health benefits of specific behaviours.
	+2		*Educate for autonomy* – e.g. a media studies curriculum that shows children how to recognise the techniques used to manipulate choice through marketing or by banning marketing primary targeted at children.
	+3	+2 Enhance	*Ensure choice is available* – e.g. requiring that menus contain items that someone seeking to maintain their health would be likely to choose.
Enable	+4		*Enable choice* – Enable individuals to change their behaviours, e.g. by offering participation in a NHS 'stop smoking' program, building cycle lanes or providing free fruit in schools.
	+5		*Collective self-binding* – e.g. a decision by a community, after debate and democratic decision making, to ban the local sale of alcohol.

a: Nuffield Council (2007); b: Griffiths & West (2015).

evaluating policy options in terms of the impact on individual autonomy is worthwhile as it allows the exploration of whether some 'intrusive' interventions (according to the Nuffield Ladder) may in fact be necessary to increase autonomy (according to the Balanced Ladder) and challenges the concept that any intervention necessarily comes at a cost to autonomy.[34]

In the absence of sufficient evidence on the effectiveness of obesity policy[5,22] guidance is required to inform ethical decision making, prioritise action and support implementation monitoring programs.[32] The concept of autonomy aligns with constructs traditionally regarded as important in the development, implementation and evaluation of obesity prevention interventions[29,31,36,37] and may provide a valuable framework for classifying obesity policy options.

Objective

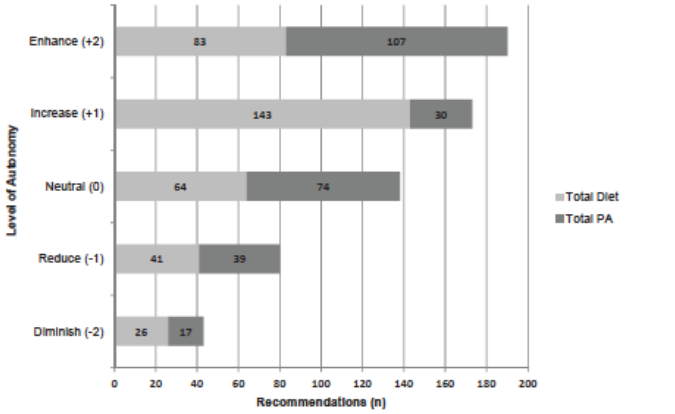
This study's aim was to explore the feasibility of classifying stakeholder policy submissions according to their impact on individual autonomy,[2,34] and to consider the application of the different levels of autonomy on government-led obesity policy development, implementation and evaluation.

Method

This study involved a review and document analysis of 158 publicly accessible submissions to the Australian Government Inquiry into Obesity (2008). This Inquiry was identified as the most recent, relevant, comprehensive and concise database of stakeholder advocacy related to obesity in Australia in the last decade. All submissions made to the Inquiry were obtained in text format. Where reference was made to supporting information, documents were obtained and analysed in accordance with the relevant submission.

Directed content analysis was performed independently (EH) via repeated readings and extraction of explicit recommendations from each submission. Quotes and summaries were extracted for analytical triangulation by the research team. From 158 submissions, a total of 1,092 discrete recommendations were extracted and charted (Supplementary Figure 1). Only recommendations concerning primary and/or secondary prevention measures were included for analysis; those related to clinical treatment, including surgery or pharmaceutical interventions, were excluded.

Figure 1: Distribution of recommendations according to target behaviour and level of autonomy (n).



Data analysis

A mixed-method analytical approach was employed in line with existing approaches to public health research.[38-41] Content analysis was used, given its relevance to deductive methodology,[42] to isolate and then categorise recommendations through the frameworks of the Nuffield Ladder and the Balanced Ladder.[34] Categories were collapsed from these frameworks to develop levels for the coding framework (Table 1, Supplementary Figure 2) and where sufficiently detailed, data was coded by setting and target behaviour (Supplementary Figure 2); those too ambiguous were coded as 'other'.

Researcher triangulation was applied to enhance the quality and credibility of the categorical analysis. Discrepancies in categorisation between researchers were resolved through discussion and agreement.

Data that did not align with pre-defined codes was identified and later analysed further, in accordance with a directed approach to content analysis.[42] Where similarity was interpreted between these recommendations, an additional ladder level was developed. These recommendations encompassed a mutual category of building capacity for effective implementation; they were deemed to have a negligible impact on individual's autonomy and impart little intrusion to individual choice. The additional 'rung' was subsequently defined as 'building capacity', assigned as neutral (0) for both the Ladders, and options were coded accordingly.

Finally, given the value of applying descriptive quantitative analysis to summarise the data,[43] data was summarised using frequencies and the proportions for each level of autonomy were calculated. Chi-square test for independence was employed as a non-parametric statistical test to explore significance ($p<0.05$) between levels recommended using SPSS Statistics for Windows (Ver 23.0. IBM, New York).

Results

A total of 1,131 discrete recommendations were extracted from 158 advocacy submissions (mean of seven recommendations per submission). Thirty-nine (<4% of total) were excluded as obesity treatment recommendations (See Supplementary Figure 1) and 1,092 were extracted and analysed through the content analysis framework (See Supplementary Figure 2). Of this total, 931 (85%) could be categorised by their level of intrusiveness and influence to autonomy (Table 1). A number of recommendations offered general guiding principles or a recommended approach to policy making rather than discrete recommendations and therefore were too ambiguous to classify through the framework (15%, n=165; coded as 'unclassified').

With regard to setting, 10% (n=89) were recommended for schools, 4% (n=36) for workplace and 81% (n=751) for community implementation; 6% (n=55) could not be classified by setting.

Of those that could be classified by behaviour (n= 624; Supplementary Figure 1), significantly greater number of

recommendations were made for dietary intervention (57%; n=357) than physical activity (n=267; 43%; $p<0.05$). However, for workplace interventions (Figure 2), recommendations to target physical activity (78%) were made more frequently than those associated with dietary behaviours (22%; $p<0.05$).

There was a significant association between the impact to autonomy and the frequency of recommendation ($p<0.001$). Recommendations that increase autonomy (46%; n=426) were more frequently recommended than those that reduce autonomy (14%; n=146), or those that have a negligible influence (38%; n=355; $p<0.005$) (Figure 1).

Setting and autonomy

There was a significant association between the impact to autonomy and setting ($p<0.001$; Figure 2). Recommendations that reduce autonomy were the least frequently recommended in every setting; but were more frequently recommended in schools (28%; n=26) than in the work place (8%; n=3) or community (15%; n=117) ($p<0.005$) (Figure 2). Only 3% (n=43) of the total recommendations diminished autonomy to the greatest extent by restricting choice and of these 78% (n=25) were recommended for implementation in schools. Restricting choice was the second most frequently recommended level of intrusiveness for school interventions (28% of school recommendations, n=25), but was infrequently suggested for the workplace (0) or community (1%; n=18).

Options that increase autonomy in the community setting, accounted for 40% of total recommendations (n=372). Promoting autonomy to the greatest extent by enabling choice, accounted for over a quarter of recommendations within each setting; including school (24%; n=21), community (24%; n=173) and workplace suggestions (50%; n=18) (Figure 2).

Options that had a negligible influence on autonomy were frequently recommended (38%; n=355). Those that 'build capacity' were most frequently recommended (29%; n=268), however the value of monitoring and surveillance was widely recognised (8%; n=77), particularly for community-wide implementation (81% of all monitoring recommendations).

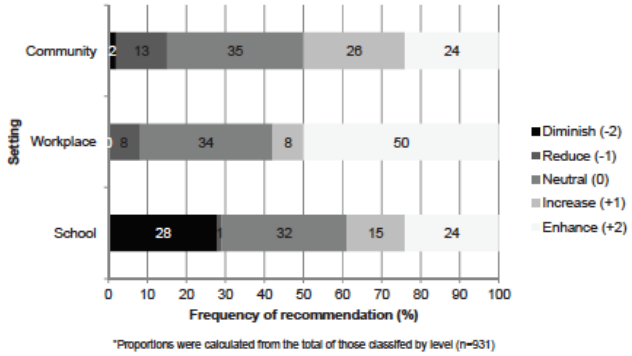
Among the options that reduce autonomy, providing incentives (9%; n=85) was more frequently recommended than providing disincentive (2%; n=18) or restricting choice (5%, n=43). Incentives were more frequently suggested for community (n=81) and work place (n=3) than in the school setting (n=1; $p<0.005$) and for physical activity (n=37) more than diet (n=26). Disincentives were not recommended by any submission for the school or workplace, and infrequently among community suggestions (2%; n=18). The majority of suggested disincentives were to influence dietary choice (83%; $p=<0.005$), such as taxing unhealthy foods.

Target behaviour and autonomy

There was a significant association between impact to autonomy and target behaviour ($p<0.001$). Enhancing autonomy to the greatest extent, by enabling choice, was frequently recommended for physical activity-related options (40%), while increasing autonomy to a lesser extent by informing choice was most highly suggested for dietary options (40%). Among all recommendations to inform choice, 68% were diet-related and14% activity-related. Among all recommendations to enable choice, 51% were activity-related and 38% diet-related. However, recommendations to diminish autonomy to the greatest extent were more common for diet (61%) than activity behaviours (39%; $p<0.001$).

Those recommendations that could not be classified by the frameworks of intrusiveness or autonomy (Supplementary Figure 1) were categorised as 'guiding principles/general approaches for policy making', and frequently emphasised the importance of collaborative working, a multi-sector comprehensive approach, and identification of priority target groups. A small number (n=7) of 'negative' recommendations were identified, whereby the submitter actively recommended against a stated intervention. Of these, the majority (n=6) opposed diet-related disincentives, incentives and marketing restrictions.

Figure 2: Proportion* of recommendations within settings.



*Proportions were calculated from the total of those classified by level (n=931)

Discussion

This study set out to explore the feasibility of classifying and assessing stakeholder policy advocacy according to impact on autonomy.[34] The results demonstrate that impact on autonomy is a relevant concept to the framing and analysis of government-led intervention for addressing obesity. Further, the specific application of the Nuffield Ladder of Intervention[2] and the Balanced Ladder of Intervention[34] to obesity policy options proposed by stakeholders demonstrates the relevance of the frameworks to real-world obesity policy advocacy.

A key finding was the significant association between the impact to autonomy, and stakeholder support. Interventions that increase individual autonomy were more frequently recommended, than those that reduce or have a negligible influence on autonomy. This direction of preference reflects resistance to the notion of developing a 'nanny state', which to date, has increased resistance toward government-led regulation.[44] Previous research supports that enabling or informing choice (approaches which enhance autonomy), may be more acceptable forms of public health intervention,[33] and their value has been recognised globally within research and public health directives.[4,30,31,45] These strategies that balance choice architecture have been implemented at state level in Australia,[8,46] and are recognised as important

by stakeholders internationally,[29] despite a lack of evidence from national-level trials to support their effectiveness.[22] The findings of this analysis supports the preference for interventions which enhance individual autonomy, among stakeholders in Australia.

In terms of the different strategies that increase autonomy, informing choice is recognised as integral to addressing obesity and the most prolifically implemented level to date.[47-49] Educational interventions, however, have been insufficient as a stand-alone strategy with their effectiveness dependent on access, availability and opportunity for healthy choice.[29,49,50] By contrast, far less attention has been paid to enhancing autonomy to a greater extent, through modifying environments to enable healthy preference learning or convenience of healthy choice,[30] despite their potential feasibility, cost effectiveness and role in dismantling the impact of socioeconomic inequality on healthy choice.[22,29,51,52] A large proportion of those that have been implemented have remained voluntary and self-regulated, which serves to undermine the effectiveness of such strategies.[53-55] Policies that target commercial organisations and public services with a voluntary approach may incite less resistance; as a lack of legislative obligation around the extent of implementation may be considered less intrusive. However, the subsequent impact that the policy has on *individual's* autonomy, once implemented, is indifferent; highlighting how policy can be variably intrusive to stakeholder groups.

Regulation or restriction

The current framing of regulation in public health policy may understate its positive influence on individual autonomy. Therefore the definitions of regulation and restriction, in the context of obesity prevention policy, may require greater transparency. The Balanced Ladder provides an illustration of how regulation, restriction and autonomy interrelate, which can be readily applied to public health policy, as confirmed in this study. The analysis highlighted a number of policy examples that were identified as restrictive to industry and services; regulation around advertising and marketing including food labelling, restrictions to the type and frequency of unhealthy food outlets within suburbs, healthy food procurement and regulation around portion size; however, when classified through the Balanced Ladder framework these examples increase individual autonomy.

Where regulation to restrict commercial organisations from promoting unhealthy choice reduces *industry* autonomy; the same may enhance *individual's* autonomy to make fair choice.

Viewing regulatory public health policy through an *individual* autonomy lens contrasts with the underlying principles of popular frameworks, such as Nuffield's Ladder, which classifies 'doing nothing' as promoting freedom to the greatest extent. This position ignores the impact of regulatory policies on rebalancing the 'obesogenic' environment, which enhances individual autonomy. The current rhetoric merges the terms regulation and restriction, which may result in consumer misunderstanding around the intrusiveness of regulatory policy. Such misconceptions may be promoted indirectly through resistance and lobbying from industry, to reduce public will when regulation around unhealthy food has been proposed, and could well account for the lack of implementation of regulative or legislative tools in Australia and elsewhere.[3,12]

Tailoring through autonomy

The association between impact to autonomy and support from stakeholders was influenced by setting and target behaviour. In this analysis, the school setting was subject to a significantly greater proportion of restrictive recommendations than any other setting, which suggests greater acceptability of restriction when targeting children. The acceptability of restrictive interventions for public health is suggested to be inversely associated with age and is further influenced by whether the individual themselves will be directly affected by policy.[33]. Furthermore, the majority of trials exploring restrictive strategies have been conducted in schools setting,[22] supporting the utility of tailoring the options proposed, in terms of their impact to autonomy, according to setting.

The recommendations that relate to diet had lesser impact on autonomy than the physical activity-related option. This finding points to the importance of health policy leadership that recognises the conflicting interests of stakeholders. Policies to promote physical activity generally do not have to contend with large commercial interests, while dietary interventions that promote individual autonomy to the highest degree are likely to simultaneously diminish the autonomy of 'Big Food' companies. Powerful lobbying against food provision regulations,[9] may account for some of the variance in support shown in this analysis between diet and physical activity options, and further suggests that clarifying the positive influence to consumers of food regulation should be a priority.

Strengths and limitations

This research provides a pragmatic, applied insight into real-world advocacy for government-led policy to address obesity in the Australian context. The analysis of submissions made to the inquiry provided a nationally relevant sample representing the diversity of stakeholders to obesity in a readily available format for analysis.

In identifying limitations, the authors acknowledge the date of the Inquiry, which was the most recent federal inquiry in Australia; however, scarce implementation of fundamental components of the Australian preventative health strategy developed in response to this Inquiry, supports the ongoing relevance of understanding barriers to implementation to advance progress toward national health targets.[6,56] Furthermore, a comparison to recommendations made in recent national and global advocacy[4,57] illustrates clear alignment with current stakeholder advocacy.

The analysis explores the impact on autonomy, setting and behaviour as variables to obesity prevention interventions. While the association between these variables and stakeholder support is remarkable, the independent influence of autonomy on support should be interpreted with caution. A number of policy characteristics are acknowledged as contributors to acceptability,[33] and therefore the concept should be valued as an addition to the larger portfolio of drivers to acceptability public health policy.

The sample used in the analysis was confined to stakeholders who were motivated to submit to the government Inquiry. The use of a sample from alternative methods that engage consumers, such as public opinion surveys,[58] may have resulted in wider representation of stakeholders including individuals less likely to contribute to a formal government inquiry, such as children. However, the submissions provided an engaged, information-rich sample, which aligns with the primary objective of this

research: to explore recommendations made directly to the Australian Government Inquiry. Analysis of stakeholder policy advocacy does not provide intelligence about the most effective or efficient policy responses to address obesity. It does provide insights about political acceptability and the various vested interests that influence policy responses. Both the framework and theory applied in this study are subject to interpretation of the concepts described, and therefore further investigation into stakeholder perceptions of the concept of autonomy and intrusion to choice is required.

Conclusion and Implication

Seven years on, the majority of the recommendations made to the Government Inquiry into Obesity have not been implemented, despite aligned recommendations in recent state-level priority-setting efforts.[57] The findings of this study validate the utility of the impact on autonomy, as proposed by the Balanced Ladder framework, for assessing obesity-related policy options. Viewing the options through an autonomy lens may predict stakeholder resistance, and the interplay of setting and target behaviour in the association between autonomy and acceptability gives rise to further opportunity to explore policy options tailored to these variables. Re-framing regulation according to *individual* and *industry* autonomy may be a valuable driver for systems change.[19] Further research around stakeholders' interpretation of these concepts is required to gain greater insight into the role of autonomy as a barrier to implementation, and as a key point of difference between stakeholder group perspectives.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary Table: Frequency of recommendations according to the key components of the content analysis framework* (Fig.1).

Supplementary Figure 1: Overview of data extraction during document analysis.

Supplementary Figure 2: Content analysis framework.

A5.4: SPSS output: Chi-squared to test association between stakeholder group/level of autonmoy for diet-related recommendations.

SGc * LA Crosstabulation

			LA		
			Enhance	Increase slightly	Total
SGc	Public health	Count	46	86	132
		% within SGc	34.8%	65.2%	100.0%
		% within LA	55.4%	60.1%	58.4%
		% of Total	20.4%	38.1%	58.4%
	Industry	Count	1	18	19
		% within SGc	5.3%	94.7%	100.0%
		% within LA	1.2%	12.6%	8.4%
		% of Total	0.4%	8.0%	8.4%
	Government	Count	13	9	22
		% within SGc	59.1%	40.9%	100.0%
		% within LA	15.7%	6.3%	9.7%
		% of Total	5.8%	4.0%	9.7%
	Consumer	Count	10	14	24
		% within SGc	41.7%	58.3%	100.0%
		% within LA	12.0%	9.8%	10.6%
		% of Total	4.4%	6.2%	10.6%
	Academic	Count	13	16	29
		% within SGc	44.8%	55.2%	100.0%
		% within LA	15.7%	11.2%	12.8%
		% of Total	5.8%	7.1%	12.8%
Total		Count	83	143	226
		% within SGc	36.7%	63.3%	100.0%
		% within LA	100.0%	100.0%	100.0%
		% of Total	36.7%	63.3%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.101[a]	4	.007
Likelihood Ratio	16.408	4	.003
Linear-by-Linear Association	2.384	1	.123
N of Valid Cases	226		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.98.

A5.5: Data table: Results 5.3

Level (A)	Level (I)	Total	School (n=89)			TS	Work (n=36)			TW	Community (n=751)			TC	Other (n=55)			TO	TD	TP
			D	PA	O		D	PA	O		D	PA	O		D	PA	O			
+2	Enable	217	8	12	1	21	3	14	1	18	72	81	20	176	0	0	2	2	83	110
+1	Inform	212	11	1	1	13	1	2	0	3	131	27	38	196	0	0	0	0	143	30
0	Default	10	0	0	0	0	0	0	0	0	5	5	0	10	0	0	0	0	5	5
	Capacity	268	2	7	9	18	0	0	10	10	32	36	121	189	0	0	51	51	34	44
	Monitor	78	4	4	3	11	0	0	2	2	21	22	19	68	0	0	2	2	25	27
-1	Incentive	85	0	1	0	1	1	2	0	3	25	34	22	81	0	0	0	0	26	37
	Disincentive	18	0	0	0	0	0	0	0	0	15	2	1	18	0	0	0	0	15	2
-2	Restrict	43	8	17	0	25	0	0	0	0	18	0	0	18	0	0	0	0	26	17
	Total (by L)	931	33	42	14	89	5	18	13	36	319	207	221	751	0	0	55	55	357	272

A5.6: Data table: Level of impact to autonomy by stakeholder group and setting

Setting		Greatly enahnce	Slightly increase	No or little impact	Slightly reduce	Greatly reduce
School	Public health	19	19	28	0	34
	Industry	50	0	37	0	13
	Government	13	37	37	0	13
	Consumers	49	0	17	0	34
	Academics	23	0	46	8	23
Community						
	Public health	26	28	34	10	2
	Industry	15	35	28	22	0
	Government	32	18	41	8	1
	Consumers	18	26	23	27	6
	Academics	21	23	36	15	5
Work						
	Public health	47	6	35	12	0
	Industry	50	0	50	0	0
	Governemnt	64	18	18	0	0
	Consumers	0	0	0	0	0
	Academics	0	0	0	100	0

A5.7: Data table: Level of impact to autonomy by stakeholder group and target behaviour.

TB	SG	Greatly enhance	Slightly increase	No or little impact	Slightly reduce	Greatly reduce
D	Public health	23	44	18	10	6
D	Industry	4	69	15	12	0
D	Government	37	26	26	9	3
D	Consumers	26	37	8	16	13
D	Academics	22	26	21	17	14
P	Public health	40	12	30	10	8
P	Industry	37	11	22	26	4
P	Government	56	12	21	9	3
P	Consumers	33	0	8	51	8
P	Academics	33	11	33	19	4

A5.8: Policy priorities identified by the Porgrow study and the Citizens Jury (Victoria): Classified by impact to autonomy.
PorGrow: Total 20 options put forward (Diet and PA).

8. Improve training for health professionals: strengthen training for health professionals in obesity prevention, diagnosing and counselling.	Monitor/Cap
9. Common Agricultural Policy reform: reform EU agricultural policy to help achieve nutritional targets.	Monitor/cap
13. More obesity research: Study the causes and effects of obesity, and why it is hard to lose weight.	Monitor/cap
18. New government body: create a new institution to coordinate policies relevant to obesity.	Monitor/cap
10. Improved health education: enhance public education to enable citizens to make healthier choices.	Inform
15. School health and nutrition education: enhance teaching food and health in the school curriculum.	Inform
20. Physical activity monitoring devices: increase the use of pedometers or similar devices, with physical activity targets.	Inform
1. Change planning and transport policies: encourage physical activity through planning and transport.	Enable
2. Improve communal sports facilities: improve the provision of sports and recreational facilities in schools and communities.	Enable
3. Controls on food and drink advertising: restrict the advertising and promotion of foods and drinks.	Enable
5. Mandatory nutritional information labelling: Require enhanced nutritional labelling, for example using front-of pack traffic light system.	Enable
14. Provide healthier catering menus: offer incentives to caterers to improve menu quality.	Enable
19. Control of marketing terms: strengthen controls on the use of terms such as 'diet', 'light', 'lite'.	Enable
17. Substitutes for fat and sugar: increase the use of synthetic fat substitutes and artificial sweeteners in food.	Default
6. Subsidies on healthy foods: provide subsidies on healthy foods to improve patterns of food intake.	Incentive
4. Control sales of foods in public institutions: control access to fatty snacks, confectionery and sweet drinks in public institutions such as schools and hospitals.	Disincen
7. Taxes on obesity-promoting foods: tax food and drink products to reduce the consumption of products that promote obesity.	Disincen
11.Controls on food composition: restrict the nutritional composition of processed food products	Restrict
12. Incentives to improve food composition: provide financial incentives to re-formulate food products.	Restrict
16. Medication for weight control: increase the use of medication to control body weight. (Treatment)	Treatment

2 were excluded as ‘other’ due to pharmacological treatment and targeting industry. Of the remaining 18: 13 (72%) enhanced or did not influence autonomy; 4 (22%) did not influence autonomy; 9 (50%) enhanced autonomy; 5 (28%) reduced autonomy

The Citizens Jury on Obesity: Asks for helping people eat better (Dietary only). Total: 24 ‘asks’.

All projects that are implemented as a result of these asks to be monitored and evaluated to determine long term outcomes.	Monitor/cap

Provide ongoing funding for community level programs that encourage healthy eating.	Monitor/cap
Ask that the Victorian government prevent companies from locking farmers into unfair, restrictive contracts.	Monitor/cap
Give local government the final say in deciding whether a fast food outlet is developed within their municipality.**(If reduce outlets then would be disincentive).**	Monitor/cap
Develop an ongoing "Life Be In It" or "Slip Slop Slap" style campaign for healthy eating across all types of media.	Inform
All donations to political parties, decision makers and regulatory organisations from food and beverage interest groups must be publically declared.	Inform
A government-funded program to teach practical skills such as budgeting, shopping and cooking to at-risk groups.	Enable
Amend State planning regulations to improve access to fresh produce by requiring the incorporation of edible, green spaces in new housing and community developments.	Enable
Amend State planning regulations to improve access to fresh produce by protecting a proportion of fertile land for agricultural purposes as opposed to housing development, specifically in the 'green belt' surrounding the outer suburbs.	Enable
Make drinking fountains and taps freely available, accessible and visible at public events and places, parks and shopping centres.	Enable
Mandate healthy eating and cooking as part of the school curriculum from pre-school to year 10.	Enable
Establish more healthy kitchens in schools, universities hospitals and large workplaces.	Enable
Ban "junk food" and beverage marketing to children under the age of 16 years.	Enable
Government funding for easy and regular access to health services which enable individuals to better their eating behaviour.	Enable
Limit the ability of food and beverage producers to market unhealthy products by advertising a healthy component of an unhealthy product.	Enable
Introduce legislation requiring all venues at all times serving food to offer at least one healthy meal option.	Enable
Government mandated health star labelling. No self-regulation of labelling in the food and beverage industry.	Enable
Ban use of discounts applied for bundling and multiple purchases designed to increase consumption of junk food and soft drink (i.e. discounting for bulk purchase).	Enable
Regulate beverage sizes, imposing a maximum size that can be sold through restaurants and retail outlets (soft drinks and other calorie-dense beverages).	Default
Restrict visibility and accessibility of 'Red traffic light' drinks and foods at the point of sale (where you complete the sale).	Default
People on low incomes will have a discount on healthy food when they go to the shops.	Incentive
Increase level of taxation by imposing an additional tax at point of purchase on sugar-sweetened beverages to raise prices and disincentivise consumption - Tax of at least 20%. (These additional taxes imposed on food and beverages must be earmarked (hypothecated) to fund new health promotion initiatives).	Disincentive
Exclusion zones of unhealthy fast food chains/franchises outlets around schools, sporting clubs, youth and community centres where children <18 years spend time.	Disincentive
Provide only healthy food and drinks in Victorian schools.	Restrict

4 (16%): No real influence to individual autonomy; 14 (58%): enhance autonomy; 6 (25%): reduce autonomy (5 slightly, 1 more so). Two of the acts which diminish autonomy the most targeted children; Three quarters of the ‘acts’ enhanced or did not influence autonomy.

A5.9: Submissions to the Federal Government Inquiry into Obesity (2007).

No.	Name (hyperlinked to PDF)
1	**Stephanie Alexander Kitchen Garden Foundation (PDF 170KB)**
2	**Ms Melanie Rieger (PDF 161KB)**
3	**Research Australia (PDF 189KB)**
4	**Ms Susanna Scurry (PDF 98KB)**
5	**Weight Management Services, The Children's Hospital at Westmead (PDF 689KB)**
6	**Institute of Obesity, Nutrition and Exercise, The University of Sydney (PDF 728KB)**
7	**The Parents Jury (PDF 490KB)**
8	**Baker Heart Research Institute (PDF 214KB)**
9	**Alzheimer's Australia (PDF 219KB)**
10	**Australian Institute of Health and Welfare (PDF 238KB)**
11	**Australian and New Zealand Obesity Society (PDF 1081KB)**
12	**Professor Roger Magnusson (PDF 577KB)**
13	**The University of Melbourne Obesity Consortium (PDF 849KB)**
14	**Sydney Medical Weight-Loss Centre (PDF 1037KB)**
15	**Women and Newborn Health Service Department of Health, WA (PDF 126KB)**
16	**Foundation for Advertising Research (PDF 331KB)**
17	**The Australian Psychological Society Ltd (PDF 1259KB)**
18	**Consumer: Name Withheld (PDF 50KB)**
19	**Professor Jan Wright(PDF 479KB)**
20	**The Austrailan Association of National Advertisers (PDF 647KB)**
21	**National Rural Health Alliance Inc. (PDF 1855KB)**
22	**Queensland Association of School Tuckshops Inc. (PDF 209KB)**

23	**Centre for Physical Activity and Nutrition Research, Deakin University (PDF 281KB)**
24	**Lachesis Biosciences (PDF 142KB)**
25	**WA Country Health Service (PDF 117KB)**
26	**Mr Daryl Sadgrove (PDF 139KB)**
27	**Australian Physiotherapy Association (PDF 489KB)**
28	**ACT Health (PDF 344KB)**
29	**Outdoor Council of Australia Inc (PDF 1558KB)**
30	**The Jean Hailes Foundation for Women's Health (PDF 887KB)**
31	**Horticulture Australia Ltd (PDF 1062KB)**
32	**Bunbury Community Health Service (PDF 837KB)**
33	**Wesley Weight Management Clinic (PDF 6544KB)**
34	**Centre for Physical Activity Across the Lifespan, Australian Catholic University (PDF 1291KB)**
35	**Australian Federation of Australia Ltd (PDF 448KB)**
36	**Australian Nut Industry Council and Nuts for Life (PDF 1067KB)**
37	**Bushwalking Australia (PDF 959KB)**
38	**Children's Nutrition Research Centre, School of Medicine, The University of Queensland (PDF 211KB)**
39	**Ms Megan Forster, The University of Queensland (PDF 86KB)**
40	**Associate Professor Katherine Samaras, St Vincent's Hospital, Sydney (PDF 489KB)**
41	**Coalition on Food Advertising to Children (PDF 378KB)**
42	**Infant Formula Manufacturers Association of Austraila Inc. (PDF 733KB)**
43	**Ms Margarita Tsiros (PDF 125KB)**
44	**Fitness Australia (PDF 590KB)**
45	**Tasmanian Breastfeeding Coalition (PDF 276KB)**

46	**Centre for Obesity Research and Education (PDF 657KB)**
47	**Young Media Australia (PDF 953KB)**
48	**Fit2play, The Queen Elizabeth Hospital Research Foundation Inc. (PDF 508KB)**
49	**Australian General Practice Network (PDF 926KB)**
50	**National Children's Youth and Law Centre (PDF 519KB)**
51	**Department of Health, Western Australia (PDF 2203KB)**
52	**Consumer: Name Withheld (PDF 83KB)**
53	**South Australian Government (PDF 1184KB)**
54	**Australian Food and Grocery Council (PDF 4107KB)**
55	**Lifestyle Medicine Pty Ltd (PDF 568KB)**
56	**Queensland Health (PDF 119KB)**
57	**Mr Rory Poulter (PDF 432KB)**
58	**Australian Association for Exercise and Sports Science (PDF 406KB)**
59	**VicHealth (PDF 1446KB)**
60	**The Centre for Independent Studies (PDF 3220KB)**
61	**Australian Council for Health, Physical Education and Recreation (PDF 554KB)**
62	**LOOK (Lifestyle of Our Kids) (PDF 1426KB)**
63	**Australian Hypnotherapists' Association (PDF 305KB)**
64	**Sports Medicine Australia (PDF 174KB)**
65	**Mr Nicholas Pucius (PDF 3932KB)**
66	**Professor Wendy Brown (PDF 484KB)**
67	**Bluearth Institute (PDF 7025KB)**
68	**Faculty of Education and Social Work, The University of Sydney (PDF 890KB)**
69	**Recreation, Sports and Aquatics Club (PDF 415KB)**
70	**Faculty of Health Sciences, The University of Sydney (PDF 578KB)**

71	**SlimMinds (PDF 1883KB)**
72	**Professor Colin Binns (PDF 586KB)**
73	**Public Health Information Development Unit (PDF 1449KB)**
74	**Merck Sharp and Dohme (Australia) Pty Ltd (PDF 1897KB)**
75	**Allergan (PDF 2844KB)**
76	**Confectionary Manufacturers of Australasia Ltd (PDF 260KB)**
77	**Planning Institute Australia (PDF 329KB)**
78	**National Centre for Epidemiology and Population Health, Australian National University (PDF 1226KB)**
79	**National Seniors Australia (PDF 1254KB)**
80	**Sanofi Aventis (PDF 812KB)**
81	**Centre for Clinical Research Excellence in Respiratory and Sleep Medicine, The University of Sydney (PDF 539KB)**
82	**Pharmaceutical Society of Australia (PDF 420KB)**
83	**Free TV Australia (PDF 1823KB)**
84	**Nutrition Australia (PDF 675KB)**
85	**Australian Bureau of Statistics (PDF 762KB)**
86	**Royal Children's Hospital, Murdoch Childrens Research Institute (PDF 536KB)**
87	**Choice (PDF 1134KB)**
88	**McDonalds Restaurants Australia Ltd (PDF 507KB)**
89	**Council on the Ageing, SA (PDF 1554KB)**
90	**Diabetes Australia NSW (PDF 819KB)**
91	**Dietitians Association of Australia (PDF 836)**
92	**Diabetes Australia (PDF 792KB)**
93	**TeleMedCare (PDF 3898KB)**

94	**Obesity Policy Coalition (PDF 11,548KB)**
95	**WHO Collaborating Centre for Obesity Prevention, Deakin University (PDF 2693KB)**
96	**Australian Unity (PDF 615KB)**
97	**Australian Beverages Council (PDF 2MB)**
98	**Associate Professor Jeff Walkley, RMIT University (PDF 546KB)**
99	**Mr Geoff Russell (PDF 285KB)**
100	**ACHPER Vic Branch (PDF 139KB)**
101	**Public Health Association Australia (PDF 667KB)**
102	**Healthy Changes (PDF 716KB)**
103	**Australian Nursing Federation (PDF 1MB)**
104	**Consumer: Name Withheld (PDF 176KB)**
105	**SP Health Co (PDF 240KB)**
106	**Heart Foundation (PDF 3.8MB)**
107	**Ms Pauline Hancock (PDF 55KB)**
108	**Tasmanian Government (PDF 959KB)**
109	**Cancer Council of Australia (PDF 1.1MB)**
110	**Mr David Brigden (PDF 359KB)**
111	**Australian Little Athletics (PDF 8.6MB)**
112	**Mrs Christianne Goss (PDF 155KB)**
113	**CSIRO Human Nutrition (PDF 3.6MB)**
114	**Dr Trevor Beard, University of Tasmania (PDF 743KB)**
115	**Australian Sports Commission (PDF 584KB)**
116	**Mr Michael Mathai, Victoria University (PDF 723KB)**
117	**Mr Paul Jones (PDF 277KB)**

118	**Association of Health Professions NSW (PDF 69KB)**
119	**Woolworths Ltd (PDF 1391KB)**
120	**Australian Healthcare and Hospitals Association (PDF 1721KB)**
121	**National Association of Retail Grocers of Australia (PDF 99KB)**
122	**Australian Medical Association (PDF 136KB)**
123	**Australian Division of World Action on Salt and Health(PDF 299KB)**
124	**Johnson and Johnson Medical Pty Ltd (PDF 1424KB)**
125	**Flinders University, Department of Nutrition and Dietetics (PDF 846KB)**
126	**Ms Tracey Browning (PDF 159KB)**
127	**Dr Rachel Bidgood (PDF 265KB)**
128	**Hunter New England Population Health (PDF 458KB)**
129	**YMCA Australia (PDF 4294KB)**
130	**City Fitness Health Club (PDF 309KB)**
131	**Australian Child and Adolescent Obesity Research Network (ACORN) (PDF 508KB)**
132	**Telethon Institute for Child Health Research (PDF 472KB)**
133	**Covidien (PDF 1503KB)**
134	**NSW Government (PDF 3394KB)**
135	**Walgett Aboriginal Medical Service (PDF 111KB)**
136	**Name Withheld (PDF 849KB)**
137	**KCI Medical Australia Pty Ltd (PDF 2237KB)**
138	**Weight Watchers Australasia (PDF 2050KB)**
139	**Australian Lifestyle Medicine Association (ALMA) (PDF 1417KB)**
140	**Tai Chi Productions (PDF 369KB)**
141	**Mr Chris Gillham (PDF 384KB)**

142	**Linda and Brian (PDF 499KB)**
143	**Mr Dean O'Rourke (PDF 470KB)**
144	**Victorian Government (PDF 1239KB)**
145	**The Hon Dick Adams MP (PDF 140KB)**
146	**Ms Lynn Barratt (PDF 209KB)**
147	**SmartShape (PDF 279KB)**
148	**Mr Paul Gross - Health Group Strategies Pty Ltd (PDF 6418KB)**
149	**Mr David Gillespie (PDF 378KB)**
150	**Miss Jessica Tidemann (PDF 182KB)**
151	**City of Fremantle (PDF 342KB)**
152	**Slow Food Perth (PDF 391KB)**
153	**Growing Communities WA (PDF 682KB)**
154	**Department of Health and Ageing (PDF 5145KB)**
155	**Mr Arthur Henderson (PDF 1585KB)**
156	**Hon Dr Bob Such MP JP (PDF 121KB)**
157	**Dr Stanley Robinson (PDF 199KB)**
158	**The Freemasons Foundation Centre for Men's Health (PDF 520KB)**

APPENDIX 6

A6.1 Presentations

The design of this study has been presented as poster presentations at:

Haynes, E. Reidlinger, P. Palermo, C. A modified ' Priority setting Partnership' for obesity prevention policy in Australia: Investigating the recommended levels of intrusiveness.

- Presented by Emily Haynes at the International Congress on Obesity (World Obesity) Vancouver, May 2016

Haynes E. Palermo C. Reidlinger D. A modified 'Priority Setting Partnership' for obesity prevention policy in Australia: Investigating the recommended levels of intrusiveness

- Presented by Emily Haynes at the European Congress on Obesity (European Association for the Study of Obesity (EASO)) Gothenburg. June 2016.

Haynes E. Palermo C. Reidlinger D. A modified Policy Delphi study for obesity prevention priorities: A study protocol.

- Presented by Emily Haynes at the Australian & New Zealand Obesity Society 2016 Annual Scientific Meeting. October 2016

Haynes E. Palermo C. Reidlinger D. A modified Policy Delphi study for obesity prevention priorities: A study protocol.

- Presented by Emily Haynes at the Gold Coast Health and Medical Research Conference. Gold Coast. 2016

Haynes E. Palermo C. Reidlinger D. Modified Policy-Delphi study for exploring obesity prevention priorities.

- Presented by Emily Haynes at the Bond University Faculty of Health Sciences and Medicine Higher Degree Research Conference, Robina, November 2016.

Fig A6.1: Example screenshot of third round survey as presented to participants (*Red text indicates the median score from the previous round. Fig A6.1.1, A6.1.2, A6.1.3, A6.1.4 present the options available to participants to rate the option by each of the four scales).*

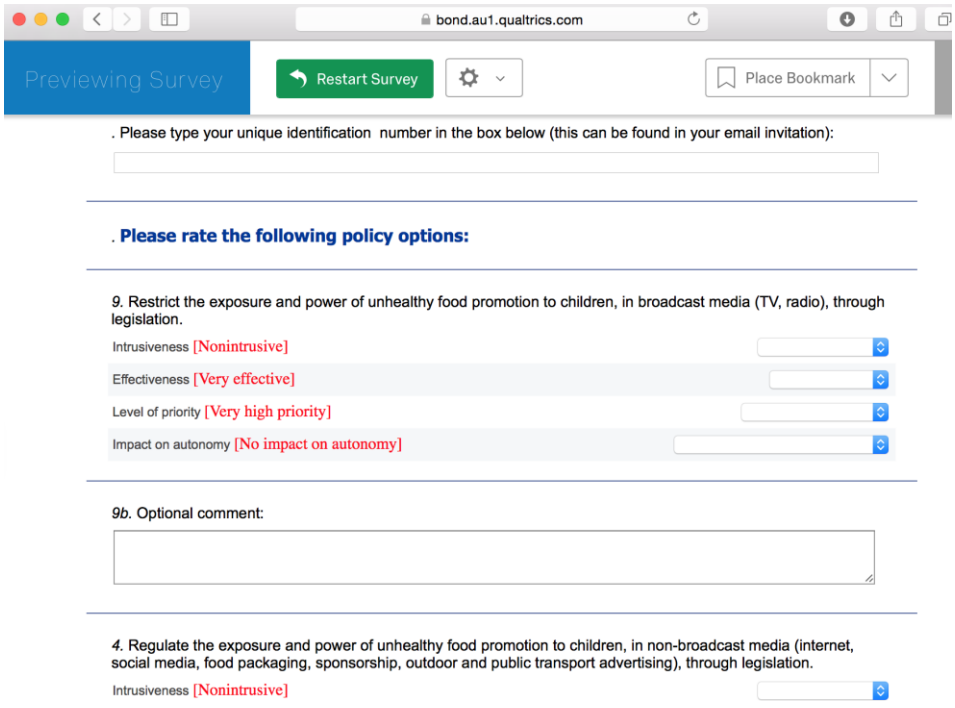


Fig A6.1.1

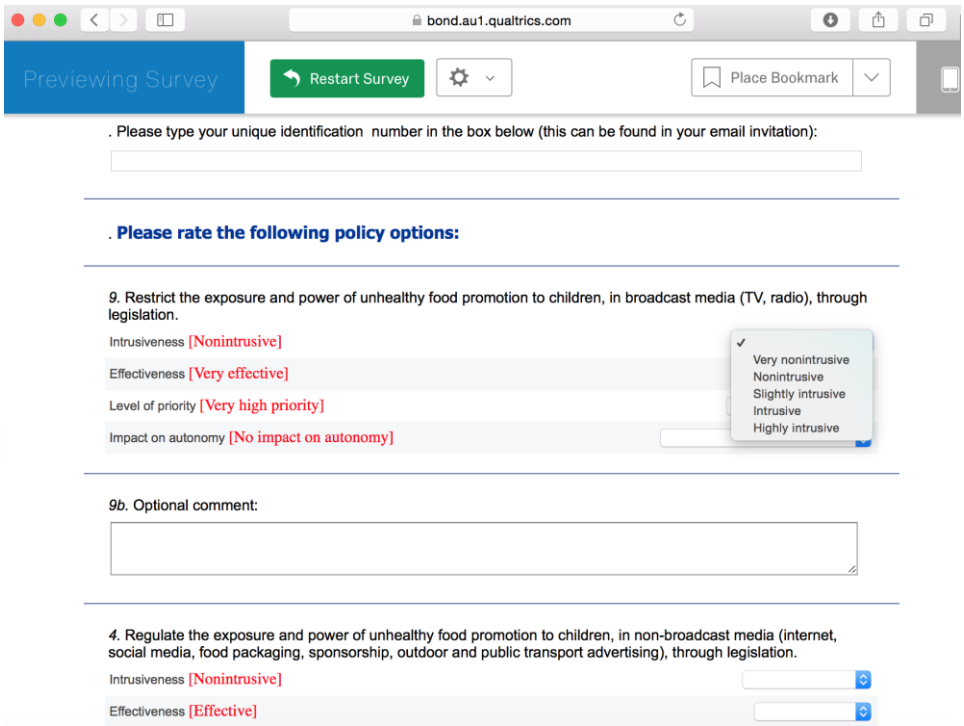


Fig A6.1.2

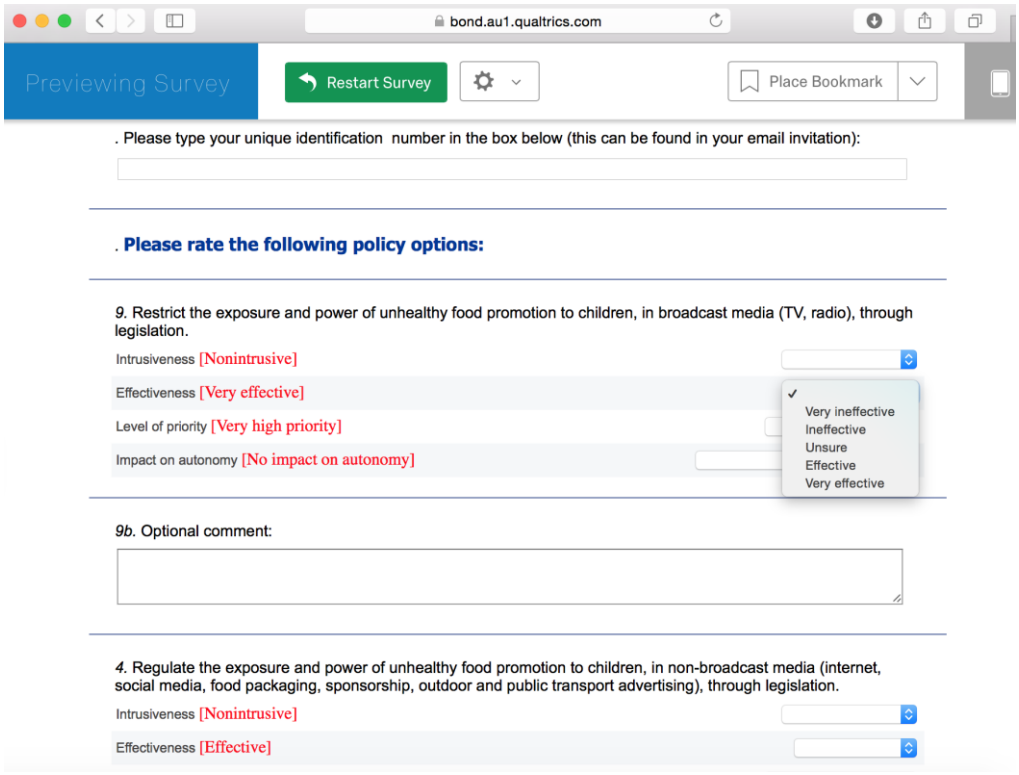


Fig A6.1.3

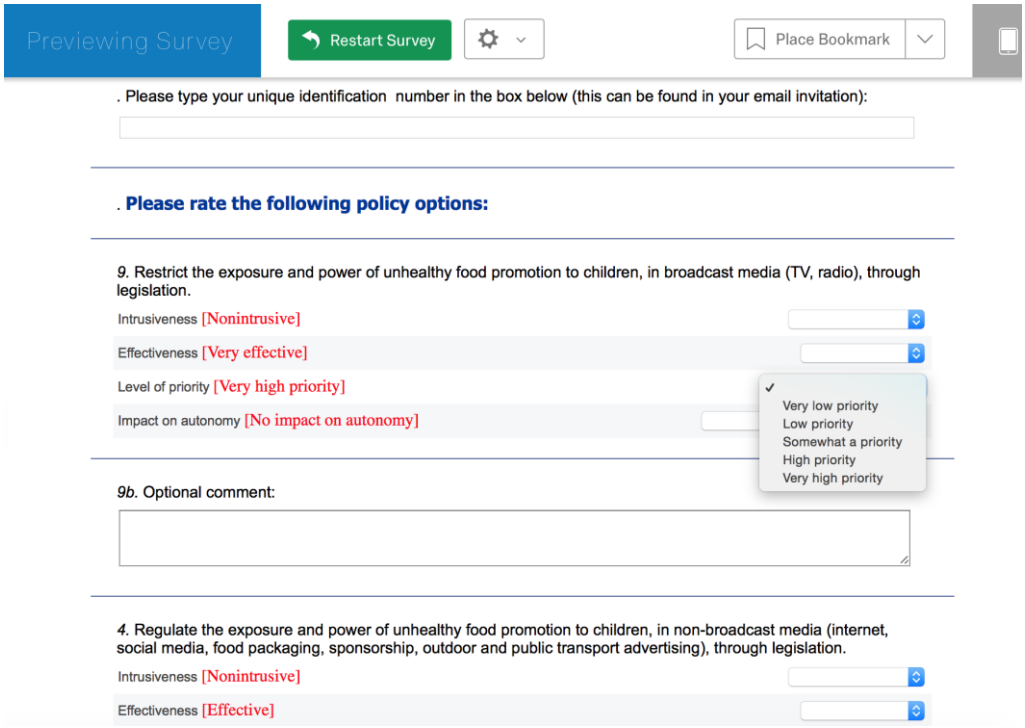
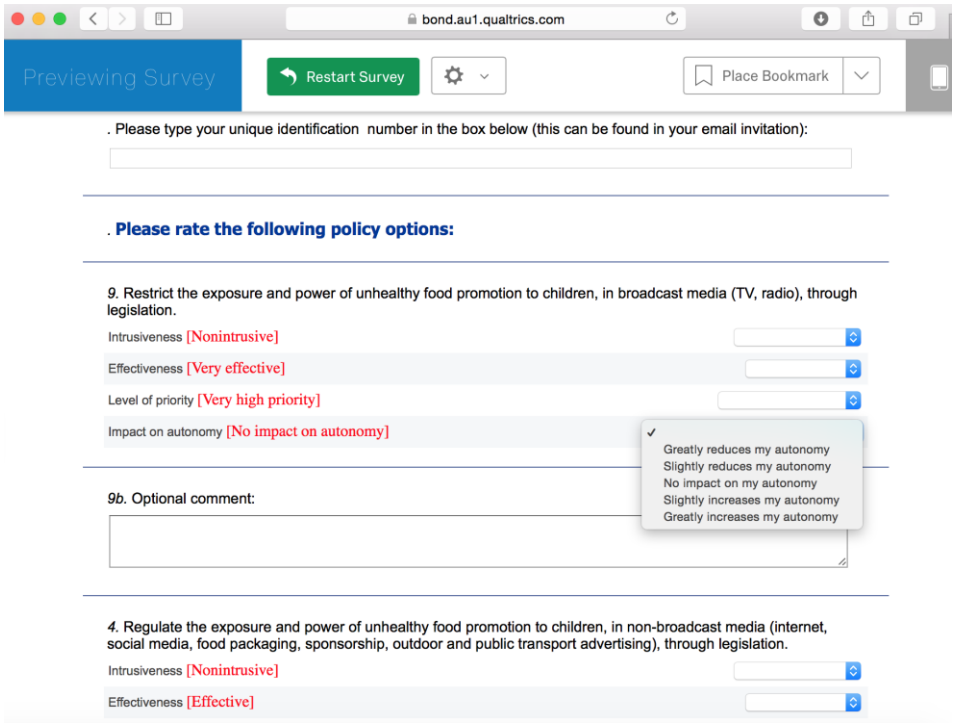


Fig A6.1.4


bond.au1.qualtrics.com
Previewing Survey
Restart Survey
Place Bookmark
. Please type your unique identification number in the box below (this can be found in your email invitation):
. Please rate the following policy options:
9. Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation.
Intrusiveness [Nonintrusive]
Effectiveness [Very effective]
Level of priority [Very high priority]
Impact on autonomy [No impact on autonomy]
Greatly reduces my autonomy
Slightly reduces my autonomy
No impact on my autonomy
Slightly increases my autonomy
Greatly increases my autonomy
9b. Optional comment:
4. Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation.
Intrusiveness [Nonintrusive]
Effectiveness [Effective]

Document 6.1: Participant information sheet and consent form

Participant Information Sheet and Consent Form

Project Title: *A modified Policy-Delphi Study for exploring obesity prevention priorities.*

Researchers:

Miss Emily Haynes, Dr Dianne Reidlinger, Dr Claire Palermo

Contact Phone: (07) 5595 3037 Contact Email: ehaynes@bond.edu.au

Why is the study being conducted?

My name is Emily Haynes and I am completing a Doctor of Philosophy at Bond University under the supervision of Dr Dianne Reidlinger.

Together with Dr Claire Palermo, we are conducting research into government-led policy options for obesity prevention in Australia, and would like you to help us in our investigation. Many individuals have differing views on how 'intrusively' we should tackle the obesity epidemic, and we are interested to hear yours.

What do I need to do?

As part of this study, you are invited to complete a three-round online survey and may also be invited to attend an optional one-day workshop (sometimes known as a focus group) in Melbourne or the Gold Coast at the end of November. You will be asked to complete one round a month for three months. The first survey round will take a maximum of 45 minutes to complete, and in rounds 2 and 3 you will **simply be asked to confirm or change** your original answers which will take a maximum of 20 minutes. During these rounds we will ask you to rate several options for tackling the obesity epidemic using multiple choice tick boxes. In particular, we are interested in how you feel about the 'intrusiveness' of the options on individual choice.

If you are invited to attend the workshop, the full details of what is involved will be explained to you after you've completed all three survey rounds, and you will be asked to provide your consent to participate in this additional part of the study.

Your participation is entirely voluntary.

How will participants be selected?

Participants must be over the age of 18 years, Australian residents and English speaking. We will include individuals from a range of backgrounds, and therefore you will be asked to provide details on your current job and any experiences you have had with obesity policy, research or practice. Your personal details will remain confidential at all times.

We will recruit individuals who exclusively meet eligibility for one of three groups:

- Consumers
- Public health practitioners
- Policy makers

Individuals with links to the food, pharmaceutical and exercise industry may not be eligible to participate. Eligibility will be assessed at the time you express interest.

How will this research be used?

The survey results will assist us in understanding why individuals value options for tackling obesity differently and may inform future priority-setting for obesity policy.

What are the risks?

There are no anticipated risks in taking part. The questions asked will not contain sensitive information. However, if you experience any distress from participation, please contact your GP for professional guidance and advice.

Am I free to withdraw?

Participation in this study is **completely voluntary** and you may withdraw at any time without the risk of negative consequences. If you choose to withdraw your participation in this study, the information you have provided until you withdraw will be used, but remain anonymous.

What if I want to make a complaint?

Should you have any complaints concerning the manner in which this research is being conducted please make contact with: Bond University Human Research Ethics Committee, c/o Bond University Office of Research Services. Bond University, Gold Coast, 4229

Tel: +61 7 5595 4194 Fax: +61 7 5595 1120 Email: buhrec@bond.edu.au

How do I express consent?

You will be sent a unique link to access your survey. In the first round you will be asked to indicate consent to participate in the three-round online survey, as part of the research study; '*a modified Policy-Delphi Study for exploring obesity prevention priorities'.*

How will my confidentiality be protected?

Your contribution in the surveys will be collected and data will be stored in a secured location at Bond University for a period of five years in accordance with the Bond University Human Research Ethics Committee guidelines. All participants' personal details will be confidential. All data will be anonymised (including names, locations and workplaces) and you will not be identifiable within any publications made as a result of this study.

Will participating cost me anything?

No, participating in the study is completely free of charge.

What happens now?

If you would like to participate, please complete the short online information form; the link to this is provided in your email. Alternatively, reply to the attached email if you would like to provide your information via phone and we will contact you shortly.

What if I want to more information about the study?

For additional information about the project, please contact Emily Haynes at ehaynes@bond.edu.au

By completing the first round of the survey you will imply consent to participate, and confirm that you have read and understood the following information. In particular you have noted that:

• You understand that providing your contact details to the researchers is entirely voluntary;

• You understand that you will be contacted by the researchers following the voluntary provision of your contact details;

• You understand that your participation in this research is entirely voluntary and that you are free to withdraw from this research at any time, without comment or penalty;

• You have had any questions answered to your satisfaction and understand that if you have any additional questions you can contact the research team;

• You have been informed that the confidentiality of the information you will provide will be safeguarded, your opinions will be treated as personal information, and your privacy respected;

• You understand that you can contact the Manager, Research Ethics, Office of Research Services, Building 1C, Level 4, Bond University (phone 07 55 954 194 or buhrec@bond.edu.au) if you have any concerns about the ethical conduct of the project;

• You declare no conflict of interest with the food industry, and are not in receipt of funding which may influence your contribution to prioritising obesity policy options; and

• You agree to participate in this study.

Document 6.2: BMJOpen publication

Open Access Protocol

BMJ Open

Modified Policy-Delphi study for exploring obesity prevention priorities

Emily Haynes,[1] Claire Palermo,[2] Dianne P Reidlinger[1]

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► Prepublication history and additional material is available. To view please visit the journal (http://dx.doi.org/10.1136/bmjopen-2016-011788).

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[1]Faculty of Health Science & Medicine, Bond University, Gold Coast, Queensland, Australia
[2]Monash University, Clayton, Victoria, Australia

Correspondence to
Emily Haynes;
ehaynes@bond.edu.au

ABSTRACT

Introduction: Until now, industry and government stakeholders have dominated public discourse about policy options for obesity. While consumer involvement in health service delivery and research has been embraced, methods which engage consumers in health policy development are lacking. Conflicting priorities have generated ethical concern around obesity policy. The concept of 'intrusiveness' has been applied to policy decisions in the UK, whereby ethical implications are considered through level of intrusiveness to choice; however, the concept has also been used to avert government regulation to address obesity. The concept of intrusiveness has not been explored from a stakeholder's perspective. The aim is to investigate the relevance of intrusiveness and autonomy to health policy development, and to explore consensus on obesity policy priorities of under-represented stakeholders.

Methods and analysis: The Policy-Delphi technique will be modified using the James Lind Alliance approach to collaborative priority setting. A total of 60 participants will be recruited to represent three stakeholder groups in the Australian context: consumers, public health practitioners and policymakers. A three-round online Policy-Delphi survey will be undertaken. Participants will prioritise options informed by submissions to the 2009 Australian Government Inquiry into Obesity, and rate the intrusiveness of those proposed. An additional round will use qualitative methods in a face-to-face discussion group to explore stakeholder perceptions of the intrusiveness of options. The novelty of this methodology will redress the balance by bringing the consumer voice forward to identify ethically acceptable obesity policy options.

Ethics and dissemination: Ethical approval was granted by the Bond University Health Research Ethics Committee. The findings will inform development of a conceptual framework for analysing and prioritising obesity policy options, which will be relevant internationally and to ethical considerations of wider public health issues. The findings will be disseminated through peer-reviewed publications, conference presentations and collaborative platforms of policy and science.

Strengths and limitations of this study

- The novelty of this method brings the under-represented voice forward to identify ethically acceptable obesity policy options.
- The findings will provide a shared understanding of the ethical concepts currently acting as barriers to policy implementation, to encourage the development of counteractive strategies.
- Participants will not represent the full spectrum of stakeholder perspectives in obesity; however, this study aims to redress the balance where certain groups currently dominate the obesity policy debate.
- The Delphi method relies on participant retention between rounds. To address this limitation, time-efficient surveys will be developed, and the initial options will be provided for the participants.

INTRODUCTION

Obesity prevalence continues to rise; no country has been successful in reversing the trend in the past 30 years.[1] The rising financial and societal cost of obesity and associated non-communicable disease has led to urgent calls to develop an effective preventative strategy at a global level, with the WHO advocating for cohesive implementation led by federal governments.[2 3]

There is a lack of empirical evidence to support policy decisions for population wide, complex public health issues such as obesity[4 5] and ethical concern around regulating individual choice in the context of obesity prevention strategies.[6–9] The concern of developing a 'nanny state' by restricting an individual's freedom has shifted focus towards individual responsibility;[7–9] however, the government's role in creating accountability for health promoting environments is recognised as integral to address the epidemic.[7 10 11]

Evidence-based policy in public health is known to be difficult to develop due to the practicalities of obtaining the 'high quality' evidence as traditionally valued in evidence-based medicine.[12] Where evidence for effective intervention is inadequate, stakeholders' opinions are highly valued by experts and may be a useful adjunct to inform policy decisions. Research supports the feasibility of involving a diverse range of stakeholders' perspectives in complex policy decisions;[13 14]

however, in the context of obesity, some perspectives are more dominant than others.[15] Vested interests within some stakeholder groups, in particular those of industry, have been suggested to stimulate conflicting priorities.[16]

In the absence of a common tool to guide obesity policy decisions, combining or adapting constructs of existing relevant frameworks may be appropriate to develop appraisal tools.[17] Valuable efforts are underway to monitor the progress of obesity-related policy implementation at national and international levels;[11 18] however, 'sophisticating' investigations of obesity interventions and policy processes, and exploring novel platforms for analysing obesity policy options, have been proposed as integral to accelerating action.[12 17 19 20] Mapping mutual components of feasible, acceptable and sustainable interventions may therefore be valuable for successful policymaking and implementation by government.

Stakeholder engagement in research methods

Consensus and appraisals methods, such as the Delphi technique, have been successfully applied to explore priorities for public health issues, where evidence for effective policy is inconclusive.[21–23] The Delphi technique, in its original form, intends to gain consensus among 'experts' on strategic priorities where there is a lack of empirical evidence.[24] The technique traditionally uses a rank or rate approach to assess a variety of options. These options are delivered in consecutive rounds of survey style questions and feedback, and reassessment is encouraged until consensus is gained; however, modifications of the technique have enabled application to a variety of situations and topics.

In the context of obesity, the Delphi technique has been successful in identifying priorities from a solo perspective of 'experts',[22] but in the light of the diversity of stakeholders involved, there is a possibility to broaden the scope of 'expertise' to share opinion across diverse perspectives including local communities.[23 25] Anonymous sharing of group opinion allows participants to 'benchmark themselves' against peer responses,[26] and share opinion without potentially destructive group dynamics.[27] However, the diversity of priorities, shaped by vested interests, exposure, experience and knowledge, is extensive, and therefore achieving consensus on priorities between stakeholders for obesity may be unrealistic.[23]

One modification is the Policy-Delphi technique; this variation explores consensus and dissent, rather than aiming to achieve consensus,[28] and provides flexibility over the classic Delphi technique to enable diverse application to various situations.[26 29] The approach can be used to map overlapping priorities from different perspectives and identify mutual priorities across stakeholder groups and therefore is a valuable exercise for investigating complex public health issues such as obesity.[26 28 30] The technique facilitates an in-depth investigation which may detect limitations, considerations and consequences of policy options which may enhance the value and success of policy implementation.[26 31] The diversity of stakeholders involved makes reaching consensus on priorities less feasible;[23] however, mapping perspectives may identify mutual concepts behind the most agreeable options to inform future research and practice. The technique provides an opportunity for participants to contribute equally, and offers additional options and comments throughout; in this respect, it gives all participants, including consumers, a voice in the complex debate.[26]

A consumer-involvement movement

The public are underexploited in policy advocacy and the decision-making process;[32] however, experts recognise the value of the 'consumer voice' in ensuring that acceptable, relevant decisions are made both in primary care and the wider political environment. Indeed, public advocacy is required to mobilise policy action and support existing proposals which have been made in the interest of public health.[32–34] Therefore, a growing proportion of health research is engaging patients to identify priorities for research and practice and inform decisions, particularly towards medical treatment.[13 23 35–40]

All members of society are influenced to some extent by the physical, social and political environment, and therefore subject to the outcome of obesity policy implementation. The voice of industry and academia are suggested as particularly powerful in the obesity debate. In public health, the voice of consumers is rapidly becoming a more integral component to effective research on the priorities for action;[16 39 41] however, the translation of the findings into practice remains inadequate.

The James Lind Alliance advocates the value of patient-centred practice for identifying research gaps regarding treatment for health conditions. Their approach, termed 'Priority Setting Partnerships'(PSP),[35] was developed to bring the perspectives of the patient, carer and practitioner together, in isolation of vested interests, through transparent methodology, to identify treatment uncertainties which are important to both groups. The underlying principles of the PSP method, such as enabling transparency, enhancing consumer voice and reducing the influence of industry in decision-making, are relevant to the development of a framework to prioritise obesity policy in Australia.

Frameworks for policy development

Ethical frameworks have been proposed as a way to classify and prioritise policy options to government, particularly where there is disagreement between stakeholders. In the UK, the Nuffield Council on Bioethics' 'Ladder of Intervention'[42] (box 1) has been used by policymakers as an ethical framework to guide decisions on obesity policy through the concept of 'intrusiveness'.[43] The concept is based on the effect of policy to individuals' 'freedom',[8] and recent reviews and authors' unpublished observations suggest an association

Box 1 The Nuffield Council on Bioethics' Ladder of Intervention*[38]

- *Eliminate choice:* Regulate in such a way as to entirely eliminate choice, for example, through compulsory isolation of patients with infectious diseases.
- *Restrict choice:* Regulate in such a way as to restrict the options available to people with the aim of protecting them, for example, removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants.
- *Guide choice through disincentive:* Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example, through taxes on cigarettes, or by discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.
- *Guide choice through incentive:* Regulations can be offered that guide choices by fiscal and other incentives, for example, offering tax-breaks for the purchase of bicycles that are used as a means of travelling to work.
- *Guide choice through changing the default policy:* For example, in a restaurant, instead of providing chips as a standard side dish (with healthier options available), menus could be changed to provide a more healthy option as standard (with chips as an option available).
- *Enable choice:* Enable individuals to change their behaviours, for example, by offering participation in an NHS 'stop smoking' programme, building cycle lanes or providing free fruit in schools.
- *Inform choice:* Inform and educate the public, for example, as a part of campaigns to encourage people to walk more or eat five portions of fruit and vegetables per day.

Do nothing or simply monitor the situation

*The Ladder illustrates that public health interventions can be classified by a spectrum of levels intrusiveness. These range from the lowest (doing nothing) to the highest (eliminating choice) level of intrusiveness to individual choice.

between the level of intrusiveness to choice and the effectiveness of intervention.[4] Further research proposes that 'intrusiveness' and the notion of influencing 'freedom' can be better described through the term 'autonomy' whereby interventions can enhance or diminish an individual's autonomy in decisions concerning their health (table 1).[44] Public health interventions which enhance autonomy are generally more acceptable;[45] however, individual perspective may be governed by how one construes this concept around the original definition of libertarianism.[46–48]

The question of whether there is an association between intrusiveness and effectiveness is under explored. In spite of general assumptions that societal resistance prevents policymakers from implementing intrusive interventions, the extent to which intrusiveness alters stakeholder perception of policy priorities is unknown. Furthermore, the concepts themselves may be interpreted with variable meaning when applied to complex public health interventions.[47–49] There is no common understanding among stakeholder groups to define 'intrusiveness' or 'autonomy' in the context of obesity prevention, nor indication of its relevance in the policymaking process. Further insight is required into how stakeholders perceive the intrusiveness of policy options for obesity and whether the concept is, or should be, relevant to policy prioritisation.

METHODS AND ANALYSIS

Design and objectives

This research employs the Policy-Delphi methodology,[28] modified and informed by the underlying principles of the James Lind Alliance approach to collaborative priority setting.[13 35 40 50 51] It will employ quantitative and qualitative methods of analysis to explore stakeholders' understanding of intrusiveness and autonomy, and to gain insight into their perspectives about the relevance of these concepts when considering obesity policy options.

The overarching aim of this study is to explore consensus on stakeholder priorities for obesity prevention policy in Australia, through the concepts of intrusion and autonomy.

The objectives are to:

1. Identify the perceived intrusiveness and the cost to autonomy of policy options prioritised by consumers, practitioners and policymakers.
2. Identify how stakeholders define concepts of intrusiveness and autonomy in the context of obesity policy, and the levels proposed by the Nuffield Council[42] and Griffiths.[44]
3. Determine the feasibility of using the modified Delphi methodology to prioritise and gain consensus, between stakeholder groups, on policy options for obesity prevention in Australia.
4. Identify the extent to which perceived intrusiveness, cost to autonomy and effectiveness govern prioritisation of policy options by stakeholders (box 2).

Participants and recruitment

This study will recruit participants to represent three perspectives: consumers, public health practitioners and policymakers. Strict inclusion criteria will be applied to recruitment (box 3); stakeholders with any commercial conflict of interest, and academics who are not defined as public health practitioners or policymakers, will be excluded from participating. The novelty of this method lies in exploring under-represented perspectives, aligned with values of the James Lind Alliance and the need for strong, impartial evidence and guidance.[10 35] Industry's influence on obesity policy progress is recognised,[10 52] and the academic voice is commonly represented in government advisory groups and funded research. The perspective of consumers and public health practitioners is disproportionally represented in the policy process, but is valued as a way to progress policy through public mobilisation: an enabler to political will.[52] Additionally, the value of including policymakers in the research process is underpinned by their integral role in successful research translation and dissemination.[53 54]

Table 1 A balanced intervention Ladder*[40]

+5?	*Collective self-binding:* For example, a decision by a community, after debate and democratic decision-making, to ban the local sale of alcohol.
+4	*Enable choice:* Enable individuals to change their behaviours, for example by offering participation in an NHS 'stop smoking' programme, building cycle lanes or providing free fruit in schools.
+3	*Ensure choice is available:* For instance, by requiring that menus contain items that someone seeking to maintain health would be likely to choose.
+2	*Educate for autonomy:* For example through a media studies curriculum which shows children how to recognise the techniques used to manipulate choice through marketing or by banning marketing primarily targeted at children.
+1	*Provide information:* Inform and educate the public, for example, as part of campaigns which inform people of the health benefits of specific behaviours.
0	*Guide choice through changing the default policy:* For example, in a restaurant, instead of providing chips as a standard side dish (with healthier options available), menus could be changed to provide a more healthy option as standard (with chips as an option available).
0	*Do nothing or simply monitor the situation*
−1	*Guide choice through incentive:* Regulations can be offered that guide choices by fiscal and other incentives, for example, offering tax-breaks for the purchase of bicycles that are used as a means of travelling to work.
−2	*Guide choice through disincentive:* Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example, through taxes on cigarettes, or by discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.
−3	*Restrict choice:* Regulate in such a way as to restrict the options available to people with the aim of protecting them, for example, removing unhealthy ingredients from foods, or unhealthy foods from shops or restaurants.
−4	*Eliminate choice:* Regulate in such a way as to entirely eliminate choice, for example, through compulsory isolation of patients with infectious diseases.

*The Balanced Ladder suggests that public health interventions can be classified across a spectrum of levels according to their influence on autonomy. These levels range from autonomy-diminishing (eliminate choice), to autonomy-enhancing (enable choice).

Box 2 Study outcomes

Primary outcomes:
- Obesity-related policy priorities from public interest stakeholders.
- Intrusiveness and cost to autonomy of stakeholder recommendations.
- A definition or shared understanding of 'intrusiveness' and 'autonomy' to inform future research.
- Feasibility of conducting a modified-Policy Delphi study for obesity policy research.
- Feasibility of gaining consensus across multiple stakeholder groups.

Primary target for dissemination:
- Public health practitioners
- Policymakers (governmental and non-governmental)
- Research
- Consumers

Relevant individuals will be identified, first, through a review of submissions to the Government Inquiry into Obesity (2009). The study details will be further distributed through social media advertisement and established professional networks of the researchers. A purposive sampling and 'snowballing' technique will be used to recruit an information-rich sample of 60 interested participants for the first online survey, including a minimum of 20 from each of the three stakeholder perspectives. There is no consensus on the optimal number of participants required for a Delphi; however, existing research suggests that a purposive sample of this size is sufficient to explore group perspectives and encourage participant retention between rounds.[22 26 55–57] In accordance with a previously successful Delphi study design,[22 58] a subsequent smaller sample will participate in face-to-face discussion (n=12–30; from the original 60 recruited for the online survey); this enables prioritised options to be informed by a diverse sample, while also ensuring that the environment is conducive to uninhibited participation during group discussion.[35 59 60] The Delphi sampling methodology is purposive and inherently biased, as the technique aims to capture rich cases of those with an interest, experience or investment in obesity policy.

Delphi procedure

This modified Policy-Delphi study is structured as a three-round Delphi survey conducted online, followed by a one-day face-to-face discussion workshop, as illustrated in figure 1.

Phase 1: online survey

A list of 30 relevant policy options will be informed by submissions made to the Australian Government Inquiry into Obesity (2009), and nationally relevant food policy recommendations, as identified by the INFORMAS framework.[18] The list will be translated to a survey-style format, and coded under key domains according to setting and target behaviour. The list will represent policy options of various levels of intrusiveness to choice, and cost to the individual's autonomy, as defined by the two previously mentioned ethical frameworks for public health policy (the 'Ladder of Intervention'[42] and

Box 3 Participant eligibility criteria

Inclusion criteria

1. Adults over 18 years of age.
2. Australian resident (we will aim to recruit representation across states).
3. English speaking.
4. Able to provide voluntary consent.
5. Access to a computer, tablet or electronic device and an internet connection to enable completion of the online survey.
6. Must exclusively meet one of the following group inclusion criteria:
   a. *Public health practitioners*: Individuals must be employed by an organisation recognised as relevant in obesity (ie, NGO, health professional).
   b. *Policymakers* (including representatives from government departments, or non-government organisations): Individuals must be employed by a local, state or federal government level department and preferably hold a position concerning policy development, or employed by a non-government organisation and hold a position concerning policy development.
   c. *Consumers*: Individuals must not meet any of the inclusion criteria for groups (a) and (b). They may represent the general community, and will include, for example, parents, workplace managers/staff and teachers.

Exclusion criteria

1. Individuals affiliated with industry through: employment; publicly declared competing interest; in receipt of funding which may influence their contribution; other recognised association.[35]
2. Academics: defined as those employed in a research community who are not also public health practitioners or policymakers.[31]
3. Any individual in receipt of funding which may influence their contribution to the prioritisation process.[35]
4. People with a cognitive impairment that prevents them from providing informed consent and understanding the nature of the study.

Balanced Ladder[44]). Each option will be sufficiently detailed to enable categorisation.

Survey Monkey (SurveyMonkey, California, USA) software will be used to develop and distribute each round. Participants will be emailed a link to the survey and invited to complete the first round within 3 weeks; a reminder will be sent if no response is obtained after 14 days.

In round 1 (R1), participants will be advised to read a list of 30 policy options (figure 1). They will be invited to rate each policy option using five-point Likert scales, through four constructs defined in table 2: Priority, Intrusiveness, Cost to Autonomy and Predicted Effectiveness. Participants will be invited to add their own option(s) if those provided do not relate to their preference.

We anticipate some diversity between each group's abilities to prioritise effectively and discriminate between options[23] which will be reported with the study results. To enhance the usability of the data, we will encourage all participants to use the full scale provided, and consider their choice as rankings as well as ratings.[23]

Responses to R1 will be pooled with others from the respective stakeholder group. The collective median and IQR of each rating will be calculated independently for each stakeholder group. The median scores for each option will be redistributed in the second round (R2) and participants invited to rerate the 30 options in the light of their peers' response (figure 1). Their individual rating from R1 will be provided as the default, and each option will be colour coded according to the median score for intrusiveness (4–5 red, 3 yellow, 1–2 green).[23]

Responses from R2 will be pooled by stakeholder group, and the median and IQR recalculated for each. In R3, the options will be redistributed and displayed in order of intrusiveness, as ranked by the median scores. Participants will be invited to rerate for a final time (figure 1).

The responses to R3 will be totalled to provide a sample of high priority options, the level of consensus within groups (defined by the IQR) and the median rating of intrusiveness, predicted effectiveness and cost to autonomy for each option. Intergroup similarities and differences will be analysed and reported.

Phase 2: discussion group

A subgroup of participants who complete all three rounds will be invited to attend the final phase of the study: a face-to-face discussion group. Purposive sampling will be employed as previously described.

A full day will be allocated and the entire session will be audio recorded. A six-part programme will be delivered during the discussion as detailed in supplementary information (see online supplementary additional file 1). In short, the lead investigator will initiate discussions and group activities designed to elicit the reasoning for the priorities will be identified through the surveys. This will include the rating and relevance of intrusiveness, cost to autonomy and evidence for effectiveness for the options, and participants' interpretation of the concepts of 'intrusiveness' and 'autonomy'. The day will conclude with a final consensus building exercise on the relevance of the concepts discussed, to the identified priorities for implementation.

Data analysis

Quantitative data will be collected from the surveys which will be analysed using basic descriptive statistical tests; frequency, median and IQR.[22 23 54] The quantitative summary of the combined responses from each stakeholder group will be calculated and distributed to participants in each round. Comparative analysis of similarities and disparities between stakeholder groups will also be undertaken, but not made available to participants in subsequent rounds of the survey. An IQR<1 will be used to indicate consensus for each of the four constructs, and a median priority score between 4 and 5 will define an option as high priority. The median scores for intrusiveness, the cost to autonomy and likely effectiveness will score the option as very low (1), low (2), moderate (3), high (4) or very high (5).

Qualitative data will be collected from the discussion group and will include an audio recording of the full day

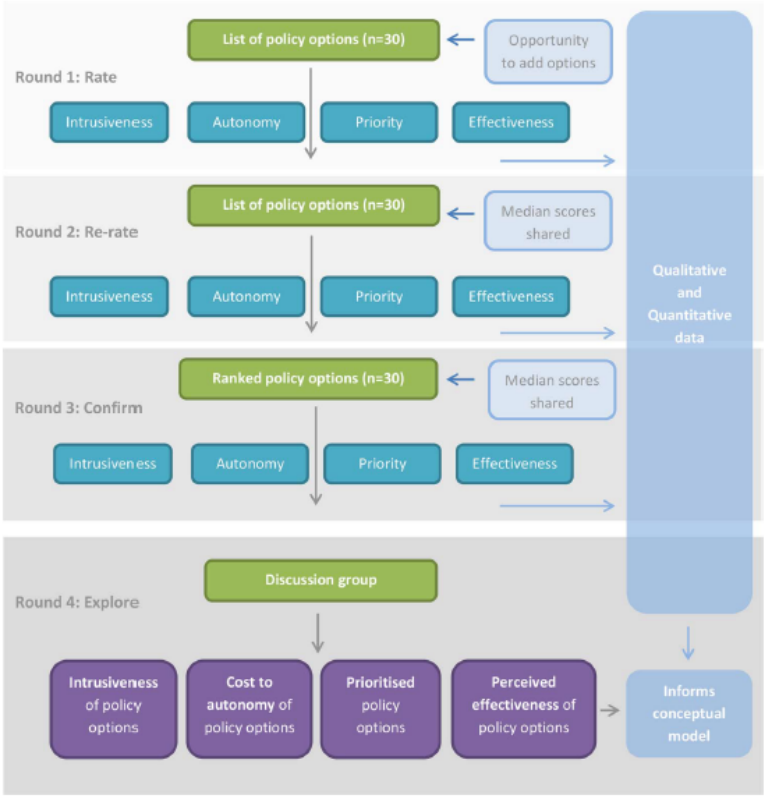

Figure 1 Flow diagram to illustrate the modified Policy-Delphi process.

Table 2 Definition of commonly used terms

Term	Definition
Priority	*Ranked importance when compared against other options.* High priority: Most relevant option. Must be implemented. Priority: Significant importance. Second-order. Low priority: Little importance. Not determining factor to major issue. Unimportant: No relevance. Not for consideration.[55]
Intrusiveness	The level of intrusion or interference on one's choice to consume healthy or unhealthy food; engage in physical activity or sedentary behaviours; participate in another behaviour which directly affects energy balance, weight gain, loss or maintenance at a given time, within the implemented setting.
Cost to autonomy	The extent to which an option influences one's capacity to self-rule or regulate.
Predicted effectiveness	The perceived, comparative success of a policy option in reducing obesity prevalence, if fully implemented.
Policy option	Any federal, state or local government-led policy action.

and photographs of any visual representations provided by the participants (ie, white board work). The recording will be transcribed verbatim and all data will be managed in NvivoV.10 software. Thematic analysis will be conducted using a framework approach, as recommended and commonly employed by qualitative research with similar objectives.[59 61] The transcript will be read and open-coded by one researcher. The text will be reread, and the codes refined. All coded data will be subsequently clustered into categories to create themes. A constant comparative approach will be used to ensure consistency,[62] and effort will be made to identify dominant, marginalised or disconfirming data. The data will be charted to provide samples and direct quotes as descriptive examples for each provisional theme. A second researcher will independently analyse the discussion transcript using the same approach and the researchers will come together to verify the key themes.

From the transcripts and derived themes, the researchers will attempt to develop shared understandings of the key constructs (intrusiveness, autonomy) that represent the views of the participants. If consensus on priority options is obtained, these will be included in the final results; however, this is not the primary objective of the study.

The Delphi method has been modified previously to suit the purpose and context of different research questions. The proposed modification facilitates anonymous and face-to-face interaction between participants, to provide quantitative and qualitative data to explore the relevance of the concepts to key perspectives, as supported by existing methods in policy research.[4 63–66]

Ethics and dissemination

We aim to use the findings to inform a conceptual framework for analysing and prioritising obesity policy options, which may be applied to strengthen proposed frameworks for obesity policy implementation.[33 34 67] The framework will be relevant internationally and to the ethical considerations of wider public health issues. The findings of this study are particularly relevant to the recent movement towards consumer engagement in health research and policy development, which suggests that all members of society may hold expertise in the acceptability of public policy implementation, through knowledge, experience or simply exposure to the lived environment.[13 16 23 36 39 41 66 68 69] Furthermore, involving policymakers is considered integral to the successful translation of the findings to practice, and therefore dissemination of the results to those who participated will be considered a priority.

The findings will be disseminated through peer-reviewed publications, conference presentations and collaborative platforms of policy and science. They will provide a novel insight into the perspectives of those under-represented in the obesity debate, on the concept of government intrusion to individual choice: a recognised barrier to government-led implementation of obesity prevention policies,[9 47 70] to encourage the development of counteractive strategies. Furthermore, where the value of health research in policy process is gaining interest,[53 71] this research investigates potential research methods for informing policy in public health.

Delphi study status

The list of options and first round survey have been developed and will be piloted internally. The first round survey will be disseminated in September 2016 and the final discussion group is scheduled for November 2016. A paper reporting the results of the Policy-Delphi is anticipated for submission in December 2016.

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Contributors EH conceived the study, contributed to the study design and drafted the manuscript. DPR and CP have made substantial contributions to the study design and have revised and approved the final version of the paper.

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Table A6.1: Cut offs for classifying consensus around intrusiveness

Rating	Category number	Consensus high	Consensus moderate	Consensus low	Direction of consensus	Consensus level on direction
Very intrusive	1	70% or more	60% or more	50% or more	Intrusive (-) (3 categories)	90% or more is high
Very intrusive-intrusive	1-2	80% or more	70% or more	60% or more		80% or more is moderate
Intrusive	2	70% or more	60% or more	50% or more		70% or more is low
Intrusive - slightly intrusive	2-3	80% or more	70% or more	60% or more		60% or more is very low
Slightly intrusive	3	70% or more	60% or more	50% or more		<60% is none
Non-intrusive	4	70% or more	60% or more	50% or more	Non-intrusive (+) (2 categories)	80% or more is high
Non-intrusive-very nonintrusive	4-5	80% or more	70% or more	60% or more		70% or more is moderate
Very non-intrusive	5	70% or more	60% or more	50% or more		60% or more is low 50% or more very low

Table A6.2: Cut offs for classifying consensus around priority

Rating	Category number	Consensus high	Consensus moderate	Consensus low	Direction of consensus	Consensus level on direction
Very low	1	70% or more	60% or more	50% or more	Low (-) (2 categories)	80% or more is high
Very low - low	1-2	80% or more	70% or more	60% or more		70% or more is moderate
Low	2	70% or more	60% or more	50% or more		60% or more is low
Somewhat	3	70% or more	60% or more	50% or more	Priority (+) (3 categories)	100% is very high 90% or more is high
Somewhat- high	3- 4	80% or more	70% or more	60% or more		80% or more is moderate
High	4	70% or more	60% or more	50% or more		70% or more is low
High- very high	4-5	80% or more	70% or more	60% or more		60% or more very low
Very high	5	70% or more	60% or more	50% or more		

Table A6.3: Cut offs for classifying consensus around effectiveness

Rating	Category number	Consensus high	Consensus moderate	Consensus low	Direction of consensus	Consensus level on direction
Very ineffective	1	70% or more	60% or more	50% or more	Ineffective (-) (2 categories)	80% or more is high
Very ineffective-ineffective	1-2	80% or more	70% or more	60% or more		70% or more is moderate
Ineffective	2	70% or more	60% or more	50% or more		60% or more is low
Effective	3	70% or more	60% or more	50% or more	Effective (+) (2 categories)	100% very high 80% or more is high
Effective – very effective	3- 4	80% or more	70% or more	60% or more		70% or more is moderate
Very effective	4	70% or more	60% or more	50% or more		60% or more is low
Unsure	-					

Table A6.4: Cut offs for classifying consensus around autonomy

Rating	Category number	Consensus high	Consensus moderate	Consensus low	Direction of consensus	Consensus level on direction
Greatly reduces	1	70% or more	60% or more	50% or more	Reduces (-) (2 categories)	80% or more is high
Greatly - slightly reduces	1-2	80% or more	70% or more	60% or more		70% or more is moderate
Slightly reduces	2	70% or more	60% or more	50% or more		60% or more is low
No impact	3	70% or more	60% or more	50% or more	No impact (0) (1 category)	70% or more is high 60% or more is moderate 50% or more is low
Slightly increases	3- 4	70% or more	60% or more	50% or more	Increases (+) (2 categories)	80% or more is high
Slightly – greatly increases	4-5	80% or more	70% or more	60% or more		70% or more is moderate
Greatly increases	4	70% or more	60% or more	50% or more		60% or more is low

Table A6.5: Round one additional options data

Participants comments for additions to round 2	
C101	If our dietary guidelines change to eating lower carbs (processed foods) we may have a chance. I grew up when there were no dietary guidelines and I had a much better diet- very few processed carbs, not even pasta. I believe saturated animal fats are extremely healthy and am sick of the low fat nonsense.
C104	Improved community education about healthy food options when experiencing obesity with other symptoms or illnesses e.g. mental health or heart conditions. Slightly intrusive. Very effective. Very high priority. Greatly increases autonomy
C106	I strongly believe Nutritionists should be teaching nutrition to both primary and secondary school children. Nutritionists should form part of the Department of Education workforce and travel to all schools both public and private to provide nutrition education to children so that each child gets a visit at least once a term.
C107	I am a little wary of suggestions about suggested national government policies, eg 35, 37 as experience has shown that strategies have to be designed and implemented relative to the local population. For example, remote communities are subject to very high food costs which is detrimental to normal nutritional needs. It needs much more than breakfast clubs to address this. Education and health literacy tailored to local environments and working collaboratively with sectors in the community such as the school, store, clinic, nurse educators will have more benefit together with subsidisation of fresh, healthy food. Also Q 31 relating to school children, great care must be taken with any evaluation in this regard that does not see children seeing themselves as labelled relative to their body weight - there are too many mental health issues arising out of that already - even lives lost (anorexia)
C109	Community education on how to manage food combinations is necessary. Education on reading labels is a must. The education of the community is needed alongside any school program so that what is learned in school is reinforced in the community and at home. The layers of education are therefore met.
C115	Not sure on how to translate this into policies... ** Organic produce should be available at reasonable prices in supermarkets and vegetable stores. I have no idea on how the chemicals used in produce affect us. I would buy these if available or I could choose better if I knew the level of pesticides I am exposed to when choosing a product. ** I try to buy healthy options but the range is sometimes small or labels are misleading . Example: "low fat yogurt" sounds good until you find out how much sugar there is in it.. Not many options for "low sugar yogurt" except for the natural "no flavour" which kids do not like. this would certainly define my decision.
C116	I believe no stand alone policy will tackle Australia's obesity problem. I feel we need a combination of all these policy options in order to have any impact. We need both government involvement and commitment at a policy level, as well as

	starting education and empowerment at an early age during all children's formative years. Also I think it's important to focus on the positive healthy policies, rather than the negative unhealthy policy options which focus on individual choices, which can in turn stigmatise people and cause equity issues for most vulnerable and/or lower socio-economic groups.
C201	Confrontational social advertising (Grim Reaper) re dangers of unhealththy food choices I3, E4, P4, A2 Rewards for healthy food choices - businesses I4, E4, P4, A3 Rewards for healthy food choices - individuals I3, E4, P4, A4
C202	Option 1: Food processing whether at home or in business outlet should prepare it less salt, sugar with no fatty, serve fresh and worm. Option 2: Production of raw materials for food industry and the use of fertilizers (must bear Australia Standards and apply the instruction thoroughly. Option 3: Research on food nutrition and healthy eating be well recommended at every household, at school and restrictions on food consumable on road or public places such as buses, trains or trams. Option 4: Poverty in some families or communities is a bigger contributor in "obesity population", people at this category go whatever the 'day or 'night' has provided them, that why is eating anywhere in every hour is so common in the disease is at its peak rising everyday. I don't how this should be addressed - but using option 4, I think we will get the 'solution'. To control the disease (obesity) and others associated it should start from "below" and monitor from the above. Intrusiveness is a level that causing a lot of disruption or annoyance through inappropriate behaviors. Effectiveness is a level of degree in which something is successful in producing a desired results. Priority is a level in which to be regarded or treated as more important than others or let do this or study the cause of obesity as first concern and most important. Impact on autonomy - this level is level of collision where the action of one object coming forcibly into contact of another.
C203	The Global Obesity epidemic must be stopped. More than 75% of human beings on the planet are now overweight or obese. The purely economic costs to our world is staggering. The toll on human health is catastrophic. With the right dietary interventions, this epidemic can be stopped and it must be stopped. The world cannot afford to allow this to continue any longer. In Australia, according to Access Economics, the cost to the economy was greater than $34.6B in 2008. By 2031, in today’s dollars the cost to treat Type 1 and Type 2DM will grow to 65% of the National Health Budget, which is 16% of GDP. We will have at least 3.3M Diabetics in this country. This health crisis can be solved but to do this we have to have the courage to say we were wrong. The change in our health started when the U.S. Dietary Guidelines for Americans (The “Guidelines”) changed in 1977. The current Guidelines which have been changed only slightly since 1977 have been shown not to be based on the best and most current science. Consequently, their efficacy in helping people stay healthy is severely limited. Because the U.S. Guidelines have long been considered the “gold standard” they were naturally followed by our country and many around the world. We need to act as one and force a change to the U.S. Guidelines and prevent their automatic adoption without proper investigation by so many other countries. This would arguably have a major impact on nutrition policy globally. In

	short, the long tentacles of the Guidelines affect not only each and every American but nearly every citizen of the world. We must challenge the belief that dietary cholesterol is the key cause of cardiovascular disease and is caused by eating saturated fat, and that when we eat fat we get fat. 1. Cease recommending a one-size-fits-all diet for the entire population and instead acknowledge that a range of diets can be used to meet nutritional needs. 2. Achieve nutritional sufficiency through whole foods, and not, as the Guidelines currently recommend, through artificially fortified refined grains. 3. Publicize the fact that the government no longer recommends a low-fat diet. 4. Ease or altogether lift caps on saturated fat intakes. 5. Recommend lower-carbohydrate diets as a safe and highly effective option for people combatting obesity, diabetes, or heart disease. 6. Cease recommending aerobic exercise as a means of creating a caloric deficit to control weight. 7. Cease across-the-board recommendations that "lower is better" for salt intake. 8. Cease telling the public that weight loss is simply a matter of calories in vs. calories out. Human metabolism is more complicated than this simple formula. 9. Cease promoting vegetable oils as the most healthy fats. 10. Cease telling the public that lean meat and low-fat dairy are preferable and that red meat is bad for health; there are no clinical trials to support this advice. 11.Guidelines should only be issued for individuals suffering from specific conditions for which there is a comprehensive body of definitive evidence from randomized, controlled clinical trials.
H101	Thank you for the opportunity - I think it is vital we start addressing environmental and policy issues to address the obesity epidemic and governance around supermarkets and ensuring there are legal boundaries as to what they can promote, and starting education of food/nutrition and food literacy - however this would requirement commitment and funding for appropriate staffing
H105	More investment into research to explore interventions to establish healthy eating habits among ALL children because; 1. eating habits formed in childhood persist into adulthood and 2. Many healthy weight children will become overweight adults if current trends continue so the focus should be on ALL children. To do this, the research should first increase knowledge about the motivations behind children's food choice directly from the children. This information can then form the foundations for building effective health promotion programs, supportive environments and health policy for children.
H112	ongoing support for the stephanie alexander kitchen garden program or similar to promote cooking skills and vegetable consumption in young children slightly intrusive; very effective; high priority; slightly increases my autonomy challenging incorrect articles and information in the media - as per the NHS fact checking unit to improve journalists' and media organisations' awareness and knowledge (NHS Choices behind the headlines) nonintrusive; effective; high priority; slightly increases my autonomy
H114	National Nutrition Policy and Implementation Plan to align stratgies addressing food security and obesity prevention/chronic disease conditions. - very nonintrusive - very effective - very high priority - no impact on my autonomy

H123	Tax on soft drinks Sugar tax serving sizes on packets to match AGHE serving sizes traffic lights or something similar to educate the public the star program is not straight forward enough and companies seem to manipulate
H128	Included in the nutrition education curriculum there should also be education on: - marketing - creating a resilient population - Food from paddock to plate (where does food come from - valuing food) - Food waste - how to prevent food waste Un-intrusive - Effective - High priority - slightly improve autonomy
P112	Include public health and obesity prevention as an objective in state planning laws and as an objective in local council strategic, environment and/or development control plans. Intrusiveness nonintrusive Effectiveness effective Priority high priority Impact no impact on my autonomy Nutrition, health and related claims standard to require products carrying nutrition content claims to meet a healthiness criteria and require pre-market approval of food and nutrient-health relationships. Intrusiveness nonintrusive Effectiveness effective Priority high priority Impact no impact on my autonomy A mandated, single, consistent, front of pack, nutrition label aligned with the Australian Dietary Guidelines. Intrusiveness nonintrusive Effectiveness effective Priority high priority Impact no impact on my autonomy Mandated kilojoule labelling of all menu items and meals at quick service restaurants and the provision of more nutrition information (saturated fat, sugar and salt) at point of purchase. Intrusiveness nonintrusive Effectiveness effective Priority high priority Impact no impact on my autonomy
P113	Focus less on individual choice focus strategies (where info campaigns etc have been to date) and focus more on what choice get put in front of consumers Ensure sufficient high quality effectiveness and economic evaluations conducted for new strategies
P117	Set limits on portion size for food items sold in foodservice settings - intrusive, effective, high priority, slightly reduce my autonomy

Additions for R2	Eight new options were defined, using the same language as used by participants, and were added to the options list for subsequent rounds. These options were coded N1-N8. N1: Revise the proportion of carbohydrate, protein and fat recommended by the national dietary guidelines (AGTHE). N2: Deliver local community food and nutrition education programs tailored to local environments (including healthy food options for obesity and related health conditions, cooking skills and reading nutritional labels. N3: Provide kitchen garden programs in all schools to improve children's cooking skills. N4: Education and resources for journalists and media organisations to reduce publication of poorly-evidence or misinterpreted information in the media.

	N5: Government to lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice. N6: Employ nutritionists as part of the Department of Education to deliver nutrition education to public, private, primary and secondary schools. N7: Develop a tool for consistent evaluation of the success of obesity-related strategies that are implemented. N8: Deliver a community wide incentive program for healthy choice. Individuals collect points and rewards for making a healthy choice in local retail outlets (i.e. discounts on leisure activities).
Others identified as already referenced in the 45 options.	Affordability/subsidies of healthy food (Option 5) Revise labels to improve clarity (Option 1) Enhance government involvement and commitment at a policy level (Option 32; also 39,41, 44 relate). Governance around supermarkets and ensuring there are legal boundaries as to what they can promote (Option 24+25) National nutrition policy and implementation plan (Option 37). Taxing sugar drinks (Option 6) Obesity to be an objective in state planning laws (Option 42) Standardised healthiness criteria for nutrition content claims (Option 2) KJ labelling at QSRs (Option 7) More investment in research to explore effective interventions to establish healthy eating habits in children (Option 36). Legislation to ban the consumption of food on public transport. i.e. bus, trains. (Already implemented in all states)

Table A6.6: Results table for individual stakeholder groups: Intrusiveness

Option	TM	TIQR	PM	PIQR	HM	HIQR	CM	CIQR
1	Nonintrusive	1	Nonintrusive-very nonintrusive	1	Nonintrusive	1	Nonintrusive	1
2	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1
3	Nonintrusive	1	Nonintrusive	1	Slightly intrusive	1	Nonintrusive	1
4	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
5	Very nonintrusive	1	Nonintrusive	1	Very nonintrusive	1	Very nonintrusive	1
6	Slightly intrusive	1 (3-4)	Slightly intrusive	0 (3)	Slightly intrusive	1 (3-4)	Slightly intrusive	2 (2-4)
7	Nonintrusive	0	Nonintrusive	0.75 (4-4.75)	Nonintrusive	0	Nonintrusive	1 (3-4)
8	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1.5 (3-4.5)
9	Nonintrusive	1 (4-5)	Nonintrusive	0.75 (4-4.75)	Nonintrusive	1 (4-5)	Nonintrusive	0
10	Slightly intrusive	1 (3-4)	Slightly intrusive	1.5 (2.25-3.75)	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (3-4)
11	Nonintrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1.5 (2.5-4)
12	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1
13	Nonintrusive	1	Nonintrusive	0.75	Nonintrusive	0	Nonintrusive	1
14	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1	Nonintrusive	2 (2-4)
15	Nonintrusive	1 (3-4)	Nonintrusive	0 (4)	Nonintrusive	1 (4-5)	Nonintrusive	1 (3-4)
16	Slightly intrusive	1 (3-4)	Slightly intrusive	0.75 (3-3.75)	Slightly intrusive	1 (3-4)	Slightly intrusive	0.5 (2.5-3)
17	Nonintrusive	1 (3-4)	Nonintrusive	0 (4)	Nonintrusive	0 (4)	Nonintrusive	1 (3-4)
18	Slightly intrusive	2	Slightly intrusive	1.75	Slightly intrusive	2	Slightly intrusive	2
19	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1 (3-4)
20	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1 (3-4)
21	Slightly intrusive	1	Slightly intrusive	1.5 (2.25-3.75)	Slightly intrusive	0 (3)	Slightly intrusive	1.5 (2-3.5)
22	Slightly intrusive	2 (2-4)	Slightly intrusive	1.75 (2-3.75)	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (2-3)
23	Nonintrusive	1 (4-5)	Nonintrusive	0 (4)	Nonintrusive	1 (4-5)	Nonintrusive	1 (4-5)
24	Nonintrusive	1 (3-4)	Slightly intrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1(3-4)
25	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1	Nonintrusive	1
26	Slightly intrusive	1 (2-3)	Slightly intrusive	1.75 (2-3.75)	Slightly intrusive	0 (3)	Slightly intrusive	1.5 (2-3.5)
27	Slightly intrusive	1 (3-4)	Slightly intrusive- non	1.75 (2.25-4)	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (2.5-3.5)
28	Slightly intrusive	2 (2-4)	Slightly intrusive	2 (2-4)	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (2-3)
29	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
30	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (3-4)	Slightly intrusive	1 (3-4)	Slightly intrusive	2 (2-4)
31	Slightly intrusive	1 (2-3)	Slightly intrusive	1 (2-3)	Slightly intrusive	1 (2-3)	Intrusive	1.5 (1.5-3)
32	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
33	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1 (4-5)	Nonintrusive	0.5 (4-4.5)
34	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0.5
35	Nonintrusive	1 (4-5)	Nonintrusive	1 (4-5)	Nonintrusive	1 (4-5)	Nonintrusive	0.5 (3.5-4)
36	Nonintrusive	1 (4-5)	Nonintrusive	0 (4)	Nonintrusive	1 (4-5)	Nonintrusive	1 (4-5)
37	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
38	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1 (4-5)
39	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1 (4-5)
40	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
41	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
42	Nonintrusive	0.75 (3.25-4)	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
43	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	1.5 (3-4.5)
44	Nonintrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1.5 (2.5-4)
45	Nonintrusive	0	Nonintrusive	0.75	Nonintrusive	0	Nonintrusive	0

N1	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
N2	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0.5 (3.5-4)
N3	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0.5 (4-4.5)
N4	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
N5	Intrusive – slightly intrusive	1 (2-3)	Intrusive	1 (2-3)	Slightly intrusive	1 (2-3)	Intrusive	1.5 (1.5-3)
N6	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
N7	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0	Nonintrusive	0
N8	Nonintrusive	1 (3-4)	Nonintrusive- slightly intrusive	1 (3-4)	Nonintrusive	1 (3-4)	Nonintrusive	1.5 (2.5 -4)

Table A6.7: Results table for individual stakeholder groups: Autonomy

Option	TM	TIQR	PM	PIQR	HM	HIQR	CM	CIQR
1	Slightly increases	1 (3-4)	Slightly increases	0.75 (4-4.75)	Slightly increases	1 (3-4)	Slightly increases	2 (3-5)
2	No impact	1	No impact	1	No impact	1	No impact	1.5
3	No impact	1	No impact	1	No impact	1	No impact	1
4	No impact	1	No impact	1	No impact	1	No impact	0.5
5	Slightly increases	2 (3-5)	Slightly increases	0.75 (4-4.75)	Slightly increases	2 (3-5)	Slightly increases	2 (3-5)
6	No impact	1 (2-3)	No impact	1 (2-3)	No impact	2 (2-4)	No impact	0 (3)
7	No impact	1	Slightly increases	1	No impact	1	No impact	1
8	No impact	1	No impact	1	No impact	1	No impact	0
9	No impact	0	No impact	1 (3-4)	No impact	0	No impact	0
10	No impact	1 (2-3)	No impact	1.5 (2.25-3.75)	No impact	1 (2-3)	No impact	0.5 (2.5-3)
11	No impact	1 (3-4)	No impact	1 (3-4)	No impact	1 (3-4)	No impact	0.5 (3-3.5)
12	No impact	0	No impact	0	No impact	1 (3-4)	No impact	1 (2-3)
13	No impact	0	No impact	0	No impact	0	No impact	0.5
14	No impact	0	No impact	0.75 (2.25-3)	No impact	1 (2-3)	No impact	1 (3-4)
15	No impact	0	No impact	0	No impact	0	No impact	0
16	No impact	1 (2-3)	Slightly reduce- no impact	1 (2-3)	No impact	1 (2-3)	No impact	0.5 (3-3.5)
17	No impact	1 (3-4)	No impact	0.75 (3-3.75)	No impact	0 (3)	No impact	1 (3-4)
18	No impact	1 (2-3)	No impact	0.75 (2.25-3)	No impact	1 (2-3)	No impact	2 (2-4)
19	No impact	0	No impact	0.75	No impact	0	No impact	0
20	No impact	0	No impact	0	No impact	0	No impact	0
21	No impact	1 (2-3)	No impact	1 (2-3)	No impact	1 (2-3)	No impact	0.5 (3-3.5)
22	No impact	1 (2-3)	No impact	1.5 (2.25-3.75)	No impact	1 (2-3)	No impact	1 (2-3)
23	No impact	1	No impact	1	Slightly increase	1	No impact	0.5
24	No impact	1	No impact- slightly increase	1	No impact	1	No impact	0
25	No impact	2 (2-4)	No impact	1 (3-4)	No impact	2 (2-4)	No impact	2 (2-4)
26	No impact	1	No impact	1.75	No impact	1	No impact	1
27	No impact	1	No impact	1	No impact	0	No impact	1
28	No impact	1 (3-4)	No impact	1 (3-4)	No impact	2 (2-4)	No impact	0 (3)
29	No impact	0	No impact	0	No impact	0	No impact	0.5 (3-3.5)
30	No impact	0	No impact	0	No impact	0	No impact	0
31	No impact	0	No impact	0	No impact	1 (2-3)	No impact	0
32	No impact	0	No impact	0.75	No impact	1	No impact	0
33	No impact	1	No impact	0.75	No impact	1	No impact	0
34	No impact	1	No impact- slightly increase	1	No impact	0	No impact	1
35	No impact	1	No impact	1	No impact	1	No impact	0
36	No impact	0	No impact	0	No impact	1	No impact	0
37	No impact	0	No impact	1	No impact	1	No impact	0
38	No impact	0	No impact	0	No impact	0	No impact	0
39	No impact	1	No impact	1	No impact	0	No impact	1
40	No impact	0	No impact	0.75	No impact	1	No impact	0
41	No impact	0	No impact	0	No impact	0	No impact	0
42	No impact	0	No impact	1 (3-4)	No impact	0	No impact	0
43	No impact	1	No impact	0	No impact	1	No impact	0
44	No impact	1	No impact	1	No impact	1	No impact	0.5 (3-3.5)

45	No impact	0	No impact	0	No impact	0	No impact	0.5
N1	No impact	0	No impact	0	No impact	0	No impact	0
N2	No impact	1	No impact	1	No impact	0	No impact	0
N3	No impact	1 (3-4)	No impact	0.75 (3-3.75)	No impact	0	No impact	0.5 (3-3.5)
N4	No impact	1 (3-4)	No impact	1 (3-4)	No impact	0	No impact	0.5 (3-3.5)
N5	No impact	0	No impact	0.75 (2.25-3)	No impact	0	No impact	0
N6	No impact	0	No impact	0	No impact	0	No impact	0
N7	No impact	0	No impact	0	No impact	0	No impact	0
N8	No impact	1	No impact	0	No impact	1	No impact	0.5

Table A6.8: Results table for individual stakeholder groups: Effectiveness

Option	TM	TIQR	PM	PIQR	HM	HIQR	CM	CIQR
1	Effective	0	Effective	0	Effective	0	Effective	0
2	Effective	0	Effective	0	Effective	0	Effective	0
3	Effective	0	Effective	0	Effective	0	Effective	1 (3-4)
4	Effective	1 (3-4)	Effective	1 (3-4)	Very effective	1 (3-4)	Effective- very effective	1 (3-4)
5	Effective	1 (3-4)	Effective	0	Very effective	1 (3-4)	Very effective	1 (3-4)
6	Effective	1 (3-4)	Effective	1 (3-4)	Effective	1 (3-4)	Effective	1 (3-4)
7	Effective	0	Effective	0	Effective	0	Effective	0
8	Effective	1 (3-4)	Effective	0	Effective- very effective	1 (3-4)	Effective	1 (3-4)
9	Very effective	1 (3-4)	Effective- very effective	1 (3-4)	Very effective	1 (3-4)	Very effective	0.75 (3.25-4)
10	Effective	0	Effective	1 (3-4)	Effective	0	Effective	0
11	Effective	0	Effective	0	Effective	0	Effective	0
12	Effective	0	Effective	0	Effective	0	Effective	0.5 (2.5 -3)
13	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
14	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
15	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
16	Effective	0	Effective	0	Effective	1 (3-4)	Effective	0
17	Effective	0	Effective	0	Effective	0	Effective	0
18	Effective	0	Effective	0	Effective	0	Effective	0
19	Effective	0	Effective	0	Effective	1 (3-4)	Effective	0
20	Effective	0	Effective	0.25 (2.75-3)	Effective	0	Effective	0
21	Effective	0	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
22	Effective	0	Effective	0	Effective	0	Effective	0
23	Effective	0	Effective	0	Effective	0	Effective	0
24	Effective	0	Effective	0	Effective	0.5 (3-3.5)	Effective	0.25 (3-3.25)
25	Effective	0	Effective	0	Effective	0	Effective	1 (3-4)
26	Effective	0	Effective	0	Effective	0	Effective	0
27	Effective	0	Effective	0	Effective	0	Effective	0.5 (3-3.5)
28	Effective	0	Effective	0	Effective	0	Effective	0
29	Effective	0	Effective	0	Effective	0	Very effective	1 (3-4)
30	Effective	1 (3-4)	Effective	1 (3-4)	Effective	0	Effective	0.5 (3-3.5)
31	Effective	1 (2-3)	Effective	0	Effective	1 (2-3)	Ineffective	1 (2-3)
32	Effective	0	Effective	0	Effective	0	Effective	0
33	Effective	0	Effective	0	Effective	0	Effective	0
34	Effective	1 (3-4)	Effective	0.5 (3-3.5)	Effective	1 (3-4)	Effective	1 (3-4)
35	Effective	1 (3-4)	Effective	0	Effective	0	Effective	0
36	Effective	0	Effective	0	Effective	1 (3-4)	Effective	0
37	Effective	1 (3-4)	Effective	1 (3-4)	Effective	1 (3-4)	Effective	1 (3-4)
38	Effective	0	Effective	0.25 (2.75-3)	Effective	1 (3-4)	Effective	0
39	Effective	0	Effective	0	Effective	0.75 (3-3.75)	Effective	0
40	Effective	0	Effective	0	Effective	0.25 (3-3.25)	Very effective	1 (3-4)
41	Effective	0	Effective	0	Effective	1 (3-4)	Effective	0
42	Effective	0	Effective	0	Effective	0.5 (3-3.5)	Effective	0
43	Effective	0	Effective	0	Effective	0	Effective	1 (2-3)
44	Effective	0	Effective	0	Effective	0	Effective	0.5 (3-3.5)

45	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
N1	Effective	0	Effective	1 (2-3)	Effective	0	Effective	0.5 (3-3.5)
N2	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
N3	Effective	1 (3-4)	Effective	0	Effective	1 (3-4)	Effective	1 (3-4)
N4	Effective	0	Effective	0	Effective	0	Effective	1 (3-4)
N5	Effective	1 (2-3)	Effective	1 (2-3)	Effective	0	Effective	1 (2-3)
N6	Effective	0	Effective	0	Effective	0	Effective	0
N7	Effective	0	Effective	0	Effective	0	Effective	0.75 (3-3.75)
N8	Effective	1 (2-3)	Ineffective	0	Effective	0	Effective	2 (2-4)

Table A6.9: Results table for individual stakeholder groups: Priority

Option	TM	TIQR	PM	PIQR	HM	HIQR	CM	CIQR
1	High	1	Somewhat	1	High	1	High	1.5
2	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (3-4)
3	Somewhat	2 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (3-4)
4	Very high	1	Very high	1	Very high	1	Very high	1
5	High	1	High	0	High	1	High	1
6	High	1 (4-5)	High	0.75 (4-4.75)	High	1 (4-5)	High	0.5 (4-4.5)
7	Somewhat	1 (4-5)	Somewhat	0 (3)	Somewhat	2 (2-4)	Somewhat	0.5 (3-3.5)
8	High	1 (3-4)	High	1 (4-4)	High	1 (3-4)	High	1.5 (3.5-5)
9	Very high	1	Very high	1	Very high	1	Very high	1
10	Somewhat	1	Somewhat	1	Somewhat	1	Somewhat	1
11	High	1	High	1	High	1	Somewhat	1
12	Somewhat	1 (3-4)	Somewhat	0 (3)	High	1 (3-4)	Somewhat	1.5 (2.5-4)
13	High	1 (4-5)	High	0	High	1 (4-5)	High	1 (3.5-4.5)
14	High	1 (4-5)	High	1 (4-5)	High	1 (4-5)	High	1 (4-5)
15	High	1 (3-4)	High	1 (3-4)	High	2 (3-5)	High	1 (4-5)
16	High	1 (3-4)	High	0	High	0	Somewhat	1 (3-4)
17	High	1	High	1	High	0	High	1
18	Somewhat	1 (3-4)	Somewhat	1 (3-4)	Somewhat	1 (2-3)	Somewhat	1 (3-4)
19	Somewhat	1	Somewhat	1	Somewhat	1	Somewhat	1
20	Somewhat	0	Somewhat	1 (2-3)	Somewhat	0	Somewhat	0
21	Somewhat	1	Somewhat	1	Somewhat	1	Somewhat	1
22	Somewhat	1 (3-4)	Somewhat	1.75 (2-3.75)	Somewhat	1 (3-4)	Somewhat	0.5 (3-3.5)
23	Somewhat	1	Somewhat	0	Somewhat	1	Somewhat	1
24	Somewhat	1	Somewhat	0	Somewhat	1	Somewhat	1
25	Somewhat	1 (3-4)	Somewhat	1 (2-3)	High	1 (3-4)	Somewhat	1 (3-4)
26	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	2 (2-4)	Somewhat	1 (3-4)
27	Somewhat	1	Somewhat	0.75	Somewhat	1	Somewhat	0
28	Somewhat	0	Somewhat	1 (2-3)	Somewhat	0	Somewhat	0
29	High	0	High	0	High	0	High	1.5 (3.5-5)
30	High	1 (4-5)	Very high	1 (4-5)	High	1 (3-4)	High	1 (3-4)
31	Somewhat	2 (2-4)	Somewhat	1.75 (2.25-4)	Somewhat	2 (2-4)	Somewhat	1 (2-3)
32	High	1	High	0	High	1	Somewhat	1
33	High	1	High	0	High	1	Somewhat	1
34	High	1	High -very high	1	High	1	High	2 (3-5)
35	High	1 (3-4)	High	0.75 (4-4.75)	High	1 (4-5)	Somewhat	1 (3-4)
36	High	1 (3-4)	High	0	High	1 (4-5)	High	1 (3-4)
37	High	2 (3-5)	High	1 (4-5)	High	0 (4)	Somewhat	1 (3-4)
38	Somewhat	1 (3-4)	Somewhat	1.5 (2.25-3.75)	High	1 (3-4)	Somewhat	1 (3-4)
39	High	1	High	1	High	1	High	1
40	Somewhat	1 (3-4)	Somewhat	1 (3-4)	High	1 (3-4)	Somewhat	1 (3-4)
41	Somewhat	1 (3-4)	Somewhat	1 (3-4)	Somewhat	1 (3-4)	Somewhat	0.5 (3-3.5)
42	High	1 (3-4)	High	1 (3-4)	High	1 (3-4)	High	1 (3-4)
43	Somewhat	1 (3-4)	Somewhat	0	Somewhat	1 (3-4)	Somewhat	1 (2-3)
44	High	1 (3-4)	High	0.75 (3.25-4)	High	1 (3-4)	High	1 (3-4)
45	High	1 (4-5)	High	0.75 (3.25-4)	High	1 (4-5)	High	1 (4-5)

N1	Somewhat	2 (2-4)	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (3-4)
N2	Somewhat	1 (3-4)	Somewhat	0.75 (3-3.75)	High	1 (3-4)	Somewhat	1 (3-4)
N3	High	1 (3-4)	Somewhat	1 (3-4)	High	1 (3-4)	High	1 (4-5)
N4	Somewhat	1	Somewhat	0	Somewhat	1	Somewhat	1
N5	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Somewhat	1 (2-3)	Low	1.5 (1.5-3)
N6	Somewhat	1 (3-4)	Somewhat	1 (2-3)	Somewhat	1 (3-4)	Somewhat	1 (3-4)
N7	Somewhat	1 (3-4)	Somewhat	0.75 (3-3.75)	Somewhat	1 (3-4)	Somewhat	1.5 (2.5-4)
N8	Somewhat	1 (2-3)	Low	1 (2-3)	Somewhat	1 (2-3)	Somewhat	2 (2-4)

Table A6.10: Comparison of impact to autonomy ratings of all stakeholders, and each stakeholder group (policy maker, public health practitioners, and consumers) with classification of impact on autonomy according the Balanced Ladder (Griffiths & West, 2015).

Option	**Autonomy (++/+/0/-/--)**				
	Autonomy (G)	A (T)	A (PM)	A (PH)	A I
13. A compulsory national school package of policies and nutrition standards, to **increase healthy choices**, including a traffic light guideline system for canteen managers	++	**No impact**	**No impact**	**No impact**	No impact
15. Provide government-subsidised healthy lunches and breakfast clubs in schools in vulnerable areas and communities (for example, Aboriginal and Torres Straight Islander communities, low income areas).	++	**No impact**	**No impact**	**No impact**	**No impact**
19. Provide resources and training for staff in schools, hospitals and other **public** settings, to promote healthy food provision in their setting (for example, recipe cards, skills training, posters, evaluation toolkit).	++	**No impact**	No impact	**No impact**	**No impact**
20. Provide resources and training for **private** companies, to promote healthy food provision in the setting (for example, recipe cards, skills training, posters, evaluation toolkit).	++	**No impact**	**No impact**	**No impact**	**No impact**
N2. Deliver local community food and nutrition education programs tailored to local environments (including healthy food options for obesity and related health conditions, cooking skills and reading nutritional labels).	++	No impact	No impact	**No impact**	**No impact**
23. Reduce license or permit requirements for local produce markets, greengrocers, healthy mobile outlets (carts) and food cooperatives, which provide fruit and vegetables.	++	No impact	No impact	Slightly increase	No impact
40. When negotiating trade agreements, assess the impact on nutrition and health of the Australian population (through a compulsory health risk impact assessment).	++	**No impact**	No impact	No impact	**No impact**
41. Strengthen the Australian government's capacity to govern international trade which influences food environments.	++	**No impact**	**No impact**	**No impact**	**No impact**
42. Introduce a Health Impact Assessment to be conducted on all government policies which prioritises them by their impact on population nutrition, health and reducing inequalities.	++	**No impact**	No impact (3-4)	**No impact**	**No impact**
43. Implement a community awards program, within settings, to encourage healthy food environments (for example, Healthy stars for healthy settings).	++	No impact	**No impact**	No impact	**No impact**
N3. Provide kitchen garden programs in all schools to improve childrens cooking skills.	++	No impact	No impact (3-3.75)	**No impact**	No impact (3-3.5)
44. Improve governments social marketing campaigns to promote dietary guidelines and a healthy weight (through TV, radio, news media, web-based, billboards, posters).	+	No impact	No impact	No impact	No impact
45. Make food/nutrition education a stand-alone subject in schools, embed into other subjects of the national curriculum, and develop mandatory 'Core Food Competencies' for children to meet by the end of pre-school, primary and secondary school.	+	**No impact**	**No impact**	**No impact**	No impact
N1. Revise the proportion of carbohydrate, protein and fat recommended by the national dietary guidelines (Australian Guide to Healthy Eating).	+	**No impact**	**No impact**	**No impact**	**No impact**
N4. Education and resources for journalists and media organisations to reduce publication of poorly-evidenced or misinterpreted information in the media.	+	No impact	No impact (3-4)	**No impact**	No impact (3-3.5)
N5. Government to lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice	+	**No impact**	No impact (2.25-3)	**No impact**	**No impact**
N6. Employ nutritionists as part of the Department of Education to deliver nutrition education to public, private, primary and secondary schools.	+	**No impact**	**No impact**	**No impact**	**No impact**
1. A single, consistent, front of pack, nutrition label aligned with standardised serving sizes of the Australian Guide to Healthy Eating.	+	Slightly increases	Slightly increases (4-4.75)	Slightly increases (3-4)	*Slightly increases (2-5)*
2. Provide an 'endorsement symbol' to recognise if a food is healthy (for example, a green tick).	+	No impact	No impact	No impact	*No impact*
3. Provide a 'warning symbol' to recognise if food is unhealthy (for example, a red cross).	+	No impact	No impact	No impact	No impact

4. Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation.	+	No impact	No impact	No impact	No impact
32. Strengthen visible political support for improving food environments by setting Australian targets, statements of intent from government and enhanced media coverage.	+	**No impact**	No impact	No impact	**No impact**
33. Clear, evidence-based dietary guidelines which provide standard serving sizes for food labels, and are informed by an expert scientific committee.	+	No impact	No impact	No impact	**No impact**
27. Restrict promotions on unhealthy foods/meals in food service outlets. Promotional activity only permitted for healthy choices.	+	No impact	No impact	**No impact**	No impact
28. Regulate food promotion so that only healthy choices can be promoted in food service outlets.	+	No impact	No impact (3-4)	*No impact (2-4)*	**No impact**
7. A single, consistent, nutrition label on menu-boards of quick service restaurants, which refer and align to serving sizes of the Australian Guide to Healthy Eating.	+	No impact	Slightly increases	No impact	No impact
8. Restrict unhealthy food marketing and sponsorship in sports events and venues	+	No impact	No impact	No impact	**No impact**
9. Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation.	+	**No impact**	No impact	**No impact**	**No impact**
17. Restrict the **promotion** of unhealthy foods in government-owned or funded public settings.	+	No impact	No impact	**No impact**	No impact
11. Mandate that healthy food and drinks are strategically placed and promoted to encourage sales in all government-owned or funded public settings (for example at the cashier, at eye line in fridges/cabinets).	0	No impact	No impact	No impact	No impact
29. Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship).	0	**No impact**	**No impact**	**No impact**	No impact
30. Monitor the populations nutritional intake, nutritional status and other NCD risk factors (physical activity, smoking, alcohol consumption) every 5 years	0	**No impact**	**No impact**	**No impact**	**No impact**
31. Monitor children's BMI annually using a school measurement programme. The height and weight of all children will be taken in the first and last year of primary school (non-participation on an 'opt-out' basis).	0	**No impact**	**No impact**	No impact	**No impact**
34. Strengthen policies which restrict commercial influences on policy decisions related to food environments.	0	No impact	No impact-slightly increase	**No impact**	No impact
35. Provide a central health promotion agency for preventative health and a public health workforce to address nutrition-related health issues in Australia.	0	No impact	No impact	No impact	**No impact**
36. Improve funding to research which targets improving food environments and reducing obesity.	0	**No impact**	**No impact**	No impact	**No impact**
37. Develop a National Obesity Strategy which shares priorities, targets and objectives across sectors and states (to improve cross-government, cross-departmental co-ordination).	0	**No impact**	No impact	No impact	**No impact**
38. Improve government to industry collaboration to develop and implement food policies.	0	**No impact**	**No impact**	**No impact**	**No impact**
39. Improve government to civil society collaboration to develop and implement food policies (includes collaboration with consumers, non-government organisations and public health professionals).	0	No impact	No impact	**No impact**	No impact
N7. Develop a tool for consistent evaluation of the success of obesity-related strategies that are implemented	0	**No impact**	**No impact**	**No impact**	**No impact**
5. **Reduce** taxes on **healthy** foods (for example, low or no sales tax, excise, value-added or import duties on fruit and vegetables).	-	*Slightly increases*	*Slightly increases* (4-4.75)	*Slightly increases* (3-5)	*Slightly increases* (3-5)
6. **Increase** taxes or levies on **unhealthy** foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods).	-	No impact	No impact (2-3)	*No impact (2-4)*	**No impact**
10. Regulate the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of **packaged foods** sold in Australia, with legislation.	-	No impact	*No impact* (2.25-3.75)	No impact	No impact
12. Provide food-related income support programs for healthy foods (such as food stamps/vouchers, tokens and discounts in retail setting for food purchases).	-	**No impact**	**No impact**	No impact (3-4)	No impact (2-3)
24. In retail environments, only allow healthy food to be the subject of in-store promotions (for example, price deals, end-of-aisle displays, checkouts, island bins, shelf and other signage).	-	No impact	No impact-slightly increase	No impact	**No impact**
N8. Deliver a community wide incentive program for healthy choice. Individuals collect points and rewards for making a healthy choices in local retail outlets (i.e. discounts on leisure activities).	-	No impact	**No impact**	No impact	No impact

14. A compulsory national school package of policies and nutrition standards, to **limit** and **restrict** the provision and promotion of unhealthy foods (such as sugar-sweetened beverages, energy dense nutrient poor snacks).	--	**No impact**	No impact (2.25-3)	No impact (2-3)	No impact (3-4)
16. Restrict the sale of unhealthy foods in government-owned or funded public settings.	--	No impact	Slightly reduce-No impact (2-3)	No impact (2-3)	No impact (3-3.5)
18. Legislation to restrict the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of packaged foods sold in Australia.	--	No impact	No impact (2.25-3)	No impact (2-3)	*No impact (2-4)*
21. Introduce planning acts, which prevent hot food takeaways trading within 400m of schools and other key public settings (such as hospitals, sports/leisure centers).	--	No impact	No impact (2-3)	No impact (2-3)	No impact (3-3.5)
22. Introduce planning acts, which restrict the number of hot food takeaways to 10% of total units per suburb.	--	No impact	*No impact* (2.25-3.75)	No impact	No impact
25. In retail stores, reduce the proportion of space dedicated to unhealthy foods (for example, less than 10% of space allocated for confectionary and sugar-sweetened beverages).	--	*No impact*	No impact (3-4)	*No impact (2-4)*	*No impact (2-4)*
26. Regulate the amount of saturated fat, sugar and salt in a standard serve of food and drink sold at all food service outlets through legislation (include all food outlets/vendors including takeaway and dine-in restaurants, cafes, coffee/snack outlets)	--	No impact	*No impact*	No impact	No impact
Consensus gained (n(%)		High = 22 Con = 29 No = 2	High = 16 Con= 33 No = 4	High = 22 Con = 27 No = 4	High = 25 Con = 23 No = 5

Table A6.11: Comparison of intrusiveness ratings of all stakeholders, and each stakeholder group (policy maker, public health practitioners, and consumers) with classification of intrusiveness according the Ladder (Nuffield Council, 2007).

Option	**Intrusiveness (N/L/M/H)**				
	Nuffield	I (T)	I (PM)	I (PH)	I (C)
18. Legislation to restrict the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of packaged foods sold in Australia.	R	*Slightly intrusive (64)*	*Slightly intrusive*	*Slightly intrusive*	*Slightly intrusive*
10. Regulate the maximum amount of saturated fat, trans fat, sugar and/or salt in a 'serve' of **packaged foods** sold in Australia, with legislation.	R	Slightly intrusive (68)	*Slightly intrusive* (2.25-3.75)	Slightly intrusive	Slightly intrusive
26. Regulate the amount of saturated fat, sugar and salt in a standard serve of food and drink sold at all food service outlets through legislation (include all food outlets/vendors including takeaway and dine-in restaurants, cafes, coffee/snack outlets)	R	Slightly intrusive (81)	*Slightly intrusive* 1.75 (2-3.75)	**Slightly intrusive**	*Slightly intrusive* 1.5 (2-3.5)
25. In retail stores, reduce the proportion of space dedicated to unhealthy foods (for example, less than 10% of space allocated for confectionary and sugar-sweetened beverages).	R	Nonintrusive (65)	Nonintrusive	Nonintrusive	Nonintrusive
14. A compulsory national school package of policies and nutrition standards, to **limit** and **restrict** the provision and promotion of unhealthy foods (such as sugar-sweetened beverages, energy dense nutrient poor snacks).	R	Nonintrusive (55)	Nonintrusive	Nonintrusive	*Nonintrusive* 2 (2-4)
16. Restrict the sale of unhealthy foods in government-owned or funded public settings.	R	Slightly intrusive (74)	Slightly intrusive	Slightly intrusive	Slightly intrusive
21. Introduce planning acts, which prevent hot food takeaways trading within 400m of schools and other key public settings (such as hospitals, sports/leisure centers).	R	Slightly intrusive (74)	*Slightly intrusive*	**Slightly intrusive**	*Slightly intrusive*
22. Introduce planning acts, which restrict the number of hot food takeaways to 10% of total units per suburb.	R	*Slightly intrusive (72)*	Slightly intrusive (3-4)	*Slightly intrusive (3-4)*	Slightly intrusive (2-3)
6. **Increase** taxes or levies on **unhealthy** foods to increase the price by at least 10% (for example, sugar sweetened beverages, energy dense, nutrient poor foods).	DIS	Slightly intrusive	**Slightly intrusive**	Slightly intrusive	*Slightly intrusive (2-4)*
5. **Reduce** taxes on **healthy** foods (for example, low or no sales tax, excise, value-added or import duties on fruit and vegetables).	INC	Very nonintrusive	Nonintrusive	Very nonintrusive	Very nonintrusive
N8. Deliver a community wide incentive program for healthy choice. Individuals collect points and rewards for making a healthy choices in local retail outlets (i.e. discounts on leisure activities).	INC	Nonintrusive	Nonintrusive	Nonintrusive	*Nonintrusive*
24. In retail environments, only allow healthy food to be the subject of in-store promotions (for example, price deals, end-of-aisle displays, checkouts, island bins, shelf and other signage).	INC	Nonintrusive	Slightly intrusive (3-4)	Nonintrusive (3-4)	Nonintrusive (3-4)
12. Provide food-related income support programs for healthy foods (such as food stamps/vouchers, tokens and discounts in retail setting for food purchases).	INC	Nonintrusive	Nonintrusive	Nonintrusive	Nonintrusive
11. Mandate that healthy food and drinks are strategically placed and promoted to encourage sales in all government-owned or funded public settings (for example at the cashier, at eye line in fridges/cabinets).	DEF	Nonintrusive	Nonintrusive	Nonintrusive	*Nonintrusive*
27. Restrict promotions on unhealthy foods/meals in food service outlets. Promotional activity only permitted for healthy choices.	E	Slightly intrusive	*Slightly intrusive-nonintrusive*	Slightly intrusive	Slightly intrusive
28. Regulate food promotion so that only healthy choices can be promoted in food service outlets.	E	*Slightly intrusive*	*Slightly intrusive (2-4)*	Slightly intrusive (3-4)	Slightly intrusive (2-3)
4. Regulate the exposure and power of unhealthy food promotion to children, in non-broadcast media (internet, social media, food packaging, sponsorship, outdoor and public transport advertising), through legislation.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**

8. Restrict unhealthy food marketing and sponsorship in sports events and venues	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	*Nonintrusive* 1.5 (3-4.5)
9. Restrict the exposure and power of unhealthy food promotion to children, in broadcast media (TV, radio), through legislation.	E	Nonintrusive	Nonintrusive (4-4.75)	Nonintrusive (4-5)	**Nonintrusive**
13. A compulsory national school package of policies and nutrition standards, to **increase healthy choices**, including a traffic light guideline system for canteen managers	E	Nonintrusive	Nonintrusive	**Nonintrusive**	Nonintrusive
15. Provide government-subsidised healthy lunches and breakfast clubs in schools in vulnerable areas and communities (for example, Aboriginal and Torres Straight Islander communities, low income areas).	E	Nonintrusive	**Nonintrusive**	Nonintrusive (4-5)	Nonintrusive (3-4)
17. Restrict the **promotion** of unhealthy foods in government-owned or funded public settings.	E	Nonintrusive	**Nonintrusive**	**Nonintrusive**	Nonintrusive (3-4)
19. Provide resources and training for staff in schools, hospitals and other **public** settings, to promote healthy food provision in their setting (for example, recipe cards, skills training, posters, evaluation toolkit).	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive (3-4)
20. Provide resources and training for **private** companies, to promote healthy food provision in the setting (for example, recipe cards, skills training, posters, evaluation toolkit).	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive (3-4)
23. Reduce license or permit requirements for local produce markets, greengrocers, healthy mobile outlets (carts) and food cooperatives, which provide fruit and vegetables.	E	Nonintrusive	**Nonintrusive**	Nonintrusive (4-5)	Nonintrusive (4-5)
41. Strengthen the Australian government's capacity to govern international trade which influences food environments.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
42. Introduce a Health Impact Assessment to be conducted on all government policies which prioritises them by their impact on population nutrition, health and reducing inequalities.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
43. Implement a community awards program, within settings, to encourage healthy food environments (for example, Healthy stars for healthy settings).	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	*Nonintrusive* 1.5 (3-4.5)
45. Make food/nutrition education a stand-alone subject in schools, embed into other subjects of the national curriculum, and develop mandatory 'Core Food Competencies' for children to meet by the end of pre-school, primary and secondary school.	E	**Nonintrusive**	Nonintrusive	**Nonintrusive**	**Nonintrusive**
N6. Employ nutritionists as part of the Department of Education to deliver nutrition education to public, private, primary and secondary schools.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
N2. Deliver local community food and nutrition education programs tailored to local environments (including healthy food options for obesity and related health conditions, cooking skills and reading nutritional labels).	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive 0.5 (3.5-4)
N3. Provide kitchen garden programs in all schools to improve childrens cooking skills.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive 0.5 (4-4.5)
N4. Education and resources for journalists and media organisations to reduce publication of poorly-evidenced or misinterpreted information in the media.	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
40. When negotiating trade agreements, assess the impact on nutrition and health of the Australian population (through a compulsory health risk impact assessment).	E	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
N1. Revise the proportion of carbohydrate, protein and fat recommended by the national dietary guidelines (Australian Guide to Healthy Eating).	I	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
44. Improve governments social marketing campaigns to promote dietary guidelines and a healthy weight (through TV, radio, news media, web-based, billboards, posters).	I	Nonintrusive	Nonintrusive	Nonintrusive	*Nonintrusive* 1.5 (2.5-4)
32. Strengthen visible political support for improving food environments by setting Australian targets, statements of intent from government and enhanced media coverage.	I	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
33. Clear, evidence-based dietary guidelines which provide standard serving sizes for food labels, and are informed by an expert scientific committee.	I	**Nonintrusive**	**Nonintrusive**	Nonintrusive 1(4-5)	Nonintrusive 0.5 (4-4.5)
7. A single, consistent, nutrition label on menu-boards of quick service restaurants, which refer and align to serving sizes of the Australian Guide to Healthy Eating.	I	**Nonintrusive**	Nonintrusive 0.75 (4-4.75)	**Nonintrusive**	Nonintrusive 1 (3-4)

1. A single, consistent, front of pack, nutrition label aligned with standardised serving sizes of the Australian Guide to Healthy Eating.	I	Nonintrusive	Nonintrusive-very nonintrusive	Nonintrusive	Nonintrusive
2. Provide an 'endorsement symbol' to recognise if a food is healthy (for example, a green tick).	I	Nonintrusive	Nonintrusive	Nonintrusive	Nonintrusive
3. Provide a 'warning symbol' to recognise if food is unhealthy (for example, a red cross).	I	Nonintrusive	Nonintrusive	Slightly intrusive	Nonintrusive
N5. Government to lead a confrontational social media campaign, using shock tactics, to publicise the dangers of unhealthy food choice	I	Intrusive	Intrusive 1 (2-3)	Slightly intrusive 1 (2-3)	*Intrusive* 1.5 (1.5-3)
N7. Develop a tool for consistent evaluation of the success of obesity-related strategies that are implemented	M	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
29. Monitor industries compliance with standards and restrictions on food provision, labelling, and promotional activity (for example, food marketing and advertising to children, sponsorship).	M	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
30. Monitor the populations nutritional intake, nutritional status and other NCD risk factors (physical activity, smoking, alcohol consumption) every 5 years	M	Slightly intrusive	Slightly intrusive (3-4)	Slightly intrusive (3-4)	*Slightly intrusive* 2 (2-4)
31. Monitor children's BMI annually using a school measurement programme. The height and weight of all children will be taken in the first and last year of primary school (non-participation on an 'opt-out' basis).	M	Slightly intrusive	Slightly intrusive (2-3)	Slightly intrusive (2-3)	*Intrusive* 1.5 (1.5-3)
34. Strengthen policies which restrict commercial influences on policy decisions related to food environments.	CAP	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive
35. Provide a central health promotion agency for preventative health and a public health workforce to address nutrition-related health issues in Australia.	CAP	Nonintrusive	Nonintrusive	Nonintrusive	Nonintrusive
36. Improve funding to research which targets improving food environments and reducing obesity.	CAP	Nonintrusive	**Nonintrusive**	Nonintrusive (4-5)	Nonintrusive (4-5)
37. Develop a National Obesity Strategy which shares priorities, targets and objectives across sectors and states (to improve cross-government, cross-departmental co-ordination).	CAP	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**
38. Improve government to industry collaboration to develop and implement food policies.	CAP	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive (4-5)
39. Improve government to civil society collaboration to develop and implement food policies (includes collaboration with consumers, non-government organisations and public health professionals).	CAP	**Nonintrusive**	**Nonintrusive**	**Nonintrusive**	Nonintrusive (4-5)
Consensus gained (n(%))		**High = 23** **Con = 27** **No = 3**	**High = 26** **Con = 21** **No = 6**	**High = 26** **Con = 25** **No = 2**	High = 13 Con = 27 No = 13

Table 6.12: Uncertainty on the effectiveness of options

Option	Total (n/%) unsure	PM % unsure	PHP % unsure	Con % unsure
1	19 (31)	7 (39)	7 (28)	5 (26)
2	18 (29)	9 (50)	8 (32)	1 (5)
3	18 (29)	7 (39)	8 (32)	3 (16)
4: General confidence across all the groups. PM very confident.	3 (5)	0 (0)	2 (8)	1 (5)
5	5 (8)	3 (17)	2 (8)	0 (0)
6	6 (10)	3 (17)	2 (8)	1 (5)
7: General uncertainty across the groups	31 (50)	9 (50)	12 (48)	10 (53)
8	11 (18)	1 (6)	7 (28)	3 (16)
9: General confidence across all the groups. PM very confident.	3 (5)	0 (0)	2(8)	1(5)
10	15(24)	3(17)	8(32)	4(21)
11	10(16)	5(28)	3(12)	2(11)
12	17(27)	7(39)	6(24)	4(21)
13	7(11)	2(11)	2(8)	3(16)
14: General confidence across all the groups.	4(6)	2(11)	2(8)	0(0)
15	9(15)	4(22)	4(16)	1(5)
16	9(15)	2(11)	6(24)	1(5)
17	17(27)	5(28)	8(32)	4(21)
18	18(29)	4(22)	12(48)	2(11)
19	22(35)	6(33)	10(40)	6(32)
20: General uncertainty across the groups	35 (56)	10(56)	12(48)	13(68)
21	16(26)	6(33)	6(24)	4(21)
22	17(27)	9(50)	3(12)	5(26)
23	22(35)	11(61)	9(36)	2(11)
24	16(26)	7(39)	6(24)	3(16)
25	11(18)	5(28)	3(12)	3(16)
26	21(34)	7(39)	10(40)	4(21)
27	27 (44)	9(50)	10(40)	8(42)
28	18(29)	6(33)	8(32)	4(21)
29: PM very confident.	7(11)	0(0)	4(16)	3(16)
30	11(18)	1(6)	6(24)	4(21)
31	25(40)	10(56)	9(36)	6(32)

32	14(23)	2(11)	6(24)	6(32)
33	17(27)	3(17)	7(28)	7(37)
34	15(24)	3(17)	6(24)	6(32)
35: Interesting confidence amongst PHP but uncertainty amongst consumers.	15(24)	3(17)	2(8)	10(53)
36	7(11)	1(6)	1(4)	5(26)
37	14(23)	3(17)	4(16)	7(37)
38	22(35)	6(33)	10(40)	6(32)
39	17(27)	5(28)	7(28)	5(26)
40: General uncertainty across the groups	34(55)	9(50)	13(52)	12(63)
41: General uncertainty across the groups	35(56)	11(61)	13(52)	11(58)
42	13(21)	2(11)	6(24)	5(26)
43: General uncertainty across PM/HP, slightly more confidence in consumers	31(50)	12(67)	13(52)	6(32)
44	12(19)	2(11)	6(24)	4(21)
45	9(15)	2(11)	4(16)	3(16)
N1	29(47)	9(50)	12(48)	8(42)
N2	11(18)	4(22)	2(8)	5(26)
N3	12(19)	7(39)	4(16)	1(5)
N4	24(39)	10(56)	9(36)	5(26)
N5: General uncertainty across the groups (most uncertainty for PM)	35(56)	13(72)	12(48)	10(53)
N6	14(23)	8(44)	5(20)	1(5)
N7	20(32)	5(28)	10(40)	5(26)
N8	28(45)	11(61)	10(40)	7(37)
Number of unsure votes in total:	896/3286 x100= 27%	301/954 x100= 32%	359/1325x100= 27%	246/1007= 24%

Table A7.1: Examples of quotes provided by participants that represent each category.

A: Potential contributors to perception of intrusiveness and impact on autonomy. Examples from each stakeholder group.

Category	Policy maker	Health practitioner	Consumer
Preference behaviour influences direction (iv): *Aligns (iv)*	Limits choices so is intrusive, but the change is in a healthy direction consistent with the choices I wish to make. (Option 14; Rating of option: *Intrusive, Greatly increases autonomy)*	Very nonintrusive for me personally as happy to have the healthy choice the only and default choice available. (Option 28; Rating of option: *Very nonintrusive, no impact to autonomy*)	I selected 'slightly increases my autonomy' as a 'warning symbol' would deter me from eating the food or reduce the amount I would consume for sure. (Option 3; Rating of option: *Slightly intrusive, slightly increases autonomy*).
Preference behaviour influences direction (iv): *Conflicts*	Too intrusive for my liking. It also places attention on nutrients rather than foods. For those who perhaps like a quality high cream ice cream on rare occasions (for example), it would also be most annoying. Would create huge nanny state cries. (Option 26; Rating of option: *Greatly reduces, highly intrusive*).	It would impact my autonomy, since there are times I feel like a "less healthy" choice and would base my decision off a promotion or menu board. (Option 28; Rating of option: *Slightly reduce, slightly intrusive)*	Could enhance my own preference for healthy food options. (Option 34; Rating of option: *Nonintrusive, slightly increases autonomy).*
Degree of change (i): *To self*	I think this would make a huge positive difference to my life therefore I rated as highly intrusive – i.e. intrusive in a positive way. It would make my work much less complicated and much easier to achieve. (Option 34; Rating of option: *Highly intrusive, greatly increases autonomy*).	I chose very non obtrusive - since I do not see this strategy having any effect on me personally. (Option 9; Rating of option: *Very nonintrusive, slightly increases autonomy*)	Again non-intrusive to me as my children take their own food and make healthy choices at school. Although I could see how it might be intrusive to others. (Option 14*;* Rating of option: *Nonintrusive, no impact on autonomy)*
Degree of change (i): *General*	Rated 'intrusiveness' as 'very nonintrusive' given the actual sale of foods wasn't restricted, so people could still access them if they wanted to. (Option 27; Rating of option: *Very nonintrusive,* no impact on autonomy)	I feel that this would be somewhat intrusive, because often sporting events are social and celebratory occasions. Although not ideal, unhealthy foods and drinks are part of the experience. If restricting marketing and sponsorship meant also restricting the sale of these products I think it would affect the experience. (Option 8; Rating of option: *Slightly intrusive, slightly reduces autonomy*).	That would be every shelf in a supermarket! (Option 25; Rating of option: *Intrusive, no impact on autonomy)*
Degree of benefit (ii)*: To self*	…I feel this would increase my autonomy because I would have more freedom to live the way I would like if food policy was more supportive of healthy outcomes.	It would be fantastic to have access to healthy food at every sport event I went to. (Option 8; Rating of option: *Nonintrusive, slightly increases)*	This type of research may be intrusive as I may be asked to answer questions on my dietary and exercise history, and reasons for that. However, the insights from this type of research could prove invaluable,

	(Option 34; Rating of option: *Slightly intrusive, slightly increases autonomy*)		and assist in efforts to address the systemic issues related to obesity in marginalised and at risk populations. If such issues were addressed, my autonomy would be greatly improved. (Option 30; Rating of option: *Slightly intrusive, greatly increases autonomy*)
Degree of benefit (ii): *General*	This could be of benefit especially for more vulnerable and disadvantaged communities where the number of fast food outlets per captia are higher in these areas. (Option 22; Rating of option: *Nonintrusive, slightly increases autonomy*)	Great idea for vulnerable families. (Option 12; Rating of option: *Very nonintrusive, no impact to autonomy)* .	I think this would assists families who although might know how to eat healthy get lost in the day to day of it all, as well as the not understanding serving sizes and misleading package claims. (Option 1; Rating of option: *Nonintrusive, no impact on autonomy*).
Negative consequences of current environment (acting on perceived benefit)	Influences the environment to be more neutral to making choices. (Option 34; Rating of option: *Nonintrusive, slightly increases autonomy*).	I work in an area of Melbourne where there is a disproportionate amount of fast food outlets and very limited access to fresh produce so I think this is a very good idea. (Option 43; Rating of option: *Very nonintrusive, greatly increases autonomy).*	Very needed where people don't "own" choices and consequences. (Option 6; Rating of option: *Nonintrusive, no impact to autonomy*)
Potential negative consequences (iii): *To self*	I have a fussy eater so if his choices were removed from school canteens then I would have less ability to use the tuckshop option when running short of time. (Option 13; Rating of option: *Slightly intrusive, slightly reduces)*	This slightly reduces my autonomy because it makes it harder to choose what I want, ie more expensive. If I want to make an occasional choice to buy high sugar content foods do the reasons behind the tax still apply to my situation, eg high health costs? Or is it a matter of the greater good. (Option 6; Rating of option: *Slightly intrusive ,slightly reduces).*	Censorship of adults -far better to encourage informed choice rather than treat people like incompetents (Option 16 ; Rating of option: *Highly intrusive, slightly reduces autonomy)*
Potential negative consequences (iii): *General* (Vulnerable/commercial)	Reduction of autonomy relates to reduced purchasing power. The danger in this approach is it may not deter the purchasing of the unhealthy food for the targeted purchaser, but may mean they have less money available for the healthy options. Increasing a cost decreases the budget, but doesn't dictate the priority. (Option 6; Rating of option: *Intrusive, slightly reduces).*	I felt this may be intrusive to some families who cannot afford healthier options and buy cheaper items in the grocery store. Walking around with a basket full of WARNING SYMBOLS may highlight their shopping choices to others and they could feel judged or labeled as unhealthy (Option 3; Rating of option: *Intrusive, slightly reduces*).	If anything a shock campaign will increase stigma against obese people, people with chronic diseases related to diets and potentially further isolate and worsen situations for marginalised groups. Unless ALL people are aware of and can access and afford healthy choices, it is unfair to promote fear and shock around unhealthy "choice", (if you can call it a choice.).

			(Option N5; Rating of option: *Highly intrusive, slightly reduces).*
	I gave it 'intrusive' because it is to the companies. However, I see it as essential that restrictions must be applied - hence very high priority. (Option 29; Rating of option: *Intrusive,* no impact on autonomy)	It is not intrusive to me. It would be to the children though. (Option 31; Rating of option: *Very nonintrusive, no impact on autonomy)* .	…I am mindful of the fundraising needs of clubs and fear that cutting off sponsorship opportunities could force costs of enrolment up which could have unexpected effects such as reducing participation rate for lower SES children (Option 4; Rating of option: *Intrusive, slightly reduces)*

**Each category is evidenced with a quote regarding impact to self, and impact to others. This indicates presence of the category titled 'Dimension' (v) (Fig.2), whereby perceptions of intrusiveness and autonomy may be differ according to whom the impact is considered.*

B: Potential contributors to attitudes toward implementation. Examples from each stakeholder group.

Sub-category	**Policy maker**	**Health practitioner**	**Consumer**
Negative consequences of current environment	Slightly intrusive as it would change the environment I live in....but intrusion is not a default negative. In this case the slight intrusion would increase my autonomy by not being subconsciously influenced by advertising (even though targeted at children, the wider community is still exposed). (Option 4; Rating of option: *Slightly intrusive,* greatly increases autonomy, *high priority)* I gave it 'intrusive' because it is to the companies. However, I see it as essential that restrictions must be applied - hence very high priority. (Option 29; Rating of option: *Intrusive, no impact on autonomy, very high priority)*	It would increase my autonomy also, as despite being a health professional I am often uncertain of the things I read, and if I could be assured that only well evidenced and correct information was published it would make my own choices easier. (Option N4; Rating of option: *Nonintrusive, slightly increases autonomy, very high priority)*	It has no impact on my autonomy but I am doubtful about making it legislation however if that is what it takes to make companies conform then I guess it must be. (Option 4; Rating of option: *Slightly intrusive, no impact on autonomy, very high priority)*
Effectiveness	No evidence these actions are effective and would only apply prospectively. (Option 21; Rating of option: *Slightly intrusive, slightly increases autonomy, very low priority)*	It still seems to be unclear as to whether taxing unhealthy food is effective. There is some indication that it may be, but perhaps greater in children than adults (Option 6; Rating of option: *Slightly intrusive*, *slightly reduces autonomy, somewhat priority).*	Need more evidence that it works. (Option 2; Rating of option: *Slightly intrusive, no impact on autonomy, somewhat priority)*
Feasibility	I feel the climate is not conducive to restricting commercial input and it would be very difficult to achieve.	Not all schools have the resources, infrastructure, capacity and volunteer support to maintain gardens. Ideally it	Great ideal but hard to achieve I imagine. (Option 28; Rating of option: (*Slightly intrusive,*

	(Option 34; Rating of option: *Nonintrusive, no impact on autonomy, somewhat priority)*	would be a great, but not a priority given other areas that have been listed.. (Option N3; Rating of option: *Nonintrusive, no impact on autonomy, somewhat priority)*	*no impact on autonomy, somewhat priority)*
Lack of acceptability general: commercial, public/political	Low priority because this would never get over the line with food industry influence. It would be a waste of time trying. (Option 26; Rating of option: *highly intrusive, slightly reduces, low priority)* There is not a lot of public faith in these endorsements currently. (Option 2; Rating of option: *Nonintrusive, greatly increases autonomy, somewhat priority)*	I think they probably have different priorities - would be stronger to have repercussions for poor journalism. Visit also think it would be impossible to monitor everything now and we need to focus teaching resilience and how to interpret what is written instead. (Option N4; Rating of option: *Nonintrusive, no impact, low priority).*	Not convinced private companies will be responsive to this approach (profit driven after all) . (Option 20*;* Rating of option: *slightly intrusive, no impact on autonomy, somewhat priority).* Will journalists read it. Conflicts with their commercial imperatives. (Option N4; Rating of option: *nonintrusive, no impact to autonomy, low priority)*

Document 6.1: Participant information sheet and consent form

Participant Information Sheet and Consent Form

Project Title: *A modified Policy-Delphi Study for exploring obesity prevention priorities.*

Researchers:

Miss Emily Haynes, Dr Dianne Reidlinger, Dr Claire Palermo

Contact Phone: (07) 5595 3037 Contact Email: ehaynes@bond.edu.au

Why is the study being conducted?

My name is Emily Haynes and I am completing a Doctor of Philosophy at Bond University under the supervision of Dr Dianne Reidlinger.

Together with Dr Claire Palermo, we are conducting research into government-led policy options for obesity prevention in Australia, and would like you to help us in our investigation. Many individuals have differing views on how 'intrusively' we should tackle the obesity epidemic, and we are interested to hear yours.

What do I need to do?

As part of this study, you are invited to complete a three-round online survey and may also be invited to attend an optional one-day workshop (sometimes known as a focus group) in Melbourne or the Gold Coast at the end of November. You will be asked to complete one round a month for three months. The first survey round will take a maximum of 45 minutes to complete, and in rounds 2 and 3 you will **simply be asked to confirm or change** your original answers which will take a maximum of 20 minutes. During these rounds we will ask you to rate several options for tackling the obesity epidemic using multiple choice tick boxes. In particular, we are interested in how you feel about the 'intrusiveness' of the options on individual choice.

If you are invited to attend the workshop, the full details of what is involved will be explained to you after you've completed all three survey rounds, and you will be asked to provide your consent to participate in this additional part of the study.

Your participation is entirely voluntary.

How will participants be selected?

Participants must be over the age of 18 years, Australian residents and English speaking. We will include individuals from a range of backgrounds, and therefore you will be asked to provide details on your current job and any experiences you have had with obesity policy, research or practice. Your personal details will remain confidential at all times.

We will recruit individuals who exclusively meet eligibility for one of three groups:

- Consumers
- Public health practitioners
- Policy makers

Individuals with links to the food, pharmaceutical and exercise industry may not be eligible to participate. Eligibility will be assessed at the time you express interest.

How will this research be used?

The survey results will assist us in understanding why individuals value options for tackling obesity differently and may inform future priority-setting for obesity policy.

What are the risks?

There are no anticipated risks in taking part. The questions asked will not contain sensitive information. However, if you experience any distress from participation, please contact your GP for professional guidance and advice.

Am I free to withdraw?

Participation in this study is **completely voluntary** and you may withdraw at any time without the risk of negative consequences. If you choose to withdraw your participation in this study, the information you have provided until you withdraw will be used, but remain anonymous.

What if I want to make a complaint?

Should you have any complaints concerning the manner in which this research is being conducted please make contact with: Bond University Human Research Ethics Committee, c/o Bond University Office of Research Services. Bond University, Gold Coast, 4229

Tel: +61 7 5595 4194 Fax: +61 7 5595 1120 Email: buhrec@bond.edu.au

How do I express consent?

You will be sent a unique link to access your survey. In the first round you will be asked to indicate consent to participate in the three-round online survey, as part of the research study; 'a *modified Policy-Delphi Study for exploring obesity prevention priorities'*.

How will my confidentiality be protected?

Your contribution in the surveys will be collected and data will be stored in a secured location at Bond University for a period of five years in accordance with the Bond University Human Research Ethics Committee guidelines. All participants' personal details will be confidential. All data will be anonymised (including names, locations and workplaces) and you will not be identifiable within any publications made as a result of this study.

Will participating cost me anything?

No, participating in the study is completely free of charge.

What happens now?

If you would like to participate, please complete the short online information form; the link to this is provided in your email. Alternatively, reply to the attached email if you would like to provide your information via phone and we will contact you shortly.

What if I want to more information about the study?

For additional information about the project, please contact Emily Haynes at ehaynes@bond.edu.au

By completing the first round of the survey you will imply consent to participate, and confirm that you have read and understood the following information. In particular you have noted that:

• You understand that providing your contact details to the researchers is entirely voluntary;

• You understand that you will be contacted by the researchers following the voluntary provision of your contact details;

• You understand that your participation in this research is entirely voluntary and that you are free to withdraw from this research at any time, without comment or penalty;

• You have had any questions answered to your satisfaction and understand that if you have any additional questions you can contact the research team;

• You have been informed that the confidentiality of the information you will provide will be safeguarded, your opinions will be treated as personal information, and your privacy respected;

• You understand that you can contact the Manager, Research Ethics, Office of Research Services, Building 1C, Level 4, Bond University (phone 07 55 954 194 or buhrec@bond.edu.au) if you have any concerns about the ethical conduct of the project;

• You declare no conflict of interest with the food industry, and are not in receipt of funding which may influence your contribution to prioritising obesity policy options; and

• You agree to participate in this study.
